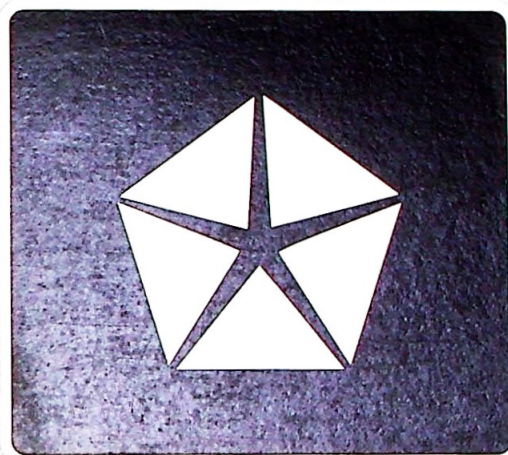


1999

Jeep® Cherokee



CHASSIS DIAGNOSTIC PROCEDURES

CAUTION

ALL SERVICE AND REBUILDING INSTRUCTIONS CONTAINED HEREIN ARE APPLICABLE TO, AND FOR THE CONVENIENCE OF, THE AUTOMOTIVE TRADE ONLY. All test and repair procedures on components or assemblies in non-automotive applications should be repaired in accordance with instructions supplied by the manufacturer of the total product.

Proper service and repair is important to the safe, reliable, operation of all motor vehicles. The service procedures recommended and described in this publication were developed for professional service personnel and are effective methods for performing vehicle repair. Following these procedures will help assure efficient economical vehicle performance and service reliability. Some of these service procedures require the use of special tools designed for specific procedures. These special tools should be used when recommended throughout this publication.

Special attention should be exercised when working with spring or tension loaded fasteners and devices such as E-Clips, Circlips, Snap rings, etc., as careless removal may cause personal injury. Always wear safety goggles whenever working on vehicles or vehicle components.

It is important to note that this publication contains various **Cautions** and **Warnings**. These should be carefully read in order to minimize the risk of personal injury, or the possibility that improper service methods may damage the vehicle or render it unsafe. It is important to note that these **Cautions** and **Warnings** cover only the situations and procedures Chrysler Corporation has encountered and recommended. Chrysler Corporation could not possibly know, evaluate, and advise the service trade of all conceivable ways that service may be performed, or of the possible hazards of each. Consequently, Chrysler Corporation has not undertaken any such broad service review. Accordingly, anyone who uses a service procedure, or tool, that is not recommended in this publication must assure oneself thoroughly that neither personal safety, nor vehicle safety, be jeopardized by the service methods they select.

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NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no text or other markings on the paper.

1.0 INTRODUCTION

The procedures contained in this manual include all the specification, instructions, and graphics needed to diagnose Mark 20 Antilock Braking System (ABS) problems. The diagnostics in this manual are based on the failure condition or symptom being present at the time of diagnosis.

When repairs are required, refer to the appropriate service manual for the proper removal and repair procedure.

Please follow the recommendations below when choosing your diagnostic path.

1. First make sure the DRB III® is communicating with the CAB. If the DRB III® displays a "No Response" condition, you must diagnose that first.
2. Read DTC's (diagnostic trouble codes) with the DRB III®.
3. If no DTC's are present, identify the customer complaint.
4. Once the DTC or customer complaint is identified, locate the matching test in the Table of Contents and begin to diagnose the symptom.

All component location views are in Section 8.0. All connector pinouts are in Section 9.0. All schematics are in Section 10.0.

An * placed before the symptom description indicated a customer complaint.

Diagnostic procedures change every year. New diagnostic systems may be added; carryover systems may be enhanced. **READ THIS MANUAL BEFORE TRYING TO DIAGNOSE A VEHICLE CODE.** It is recommended that you review the entire manual to become familiar with all new and changed diagnostic procedures.

After using this book, if you have any comments or recommendations, please fill out the form at the back of the book and mail it back to us.

1.1 SYSTEM COVERAGE

Diagnostic manual covers the Teves Mark 20 Antilock Braking System (ABS) found on the 1999 Jeep Cherokee.

1.2 SIX-STEP TROUBLESHOOTING PROCEDURE

Diagnosis of the antilock brake system is done in six basic steps:

- verification of complaint
- verification of any related symptoms
- symptom analysis
- problem isolation

- repair of isolated problem
- verification of proper operation

2.0 IDENTIFICATION OF SYSTEM

Vehicles equipped with the Teves Mark 20 antilock brake system can be identified by the presence of the hydraulic control unit located with the controller antilock brake (CAB) under the hood near the air cleaner housing.

3.0 SYSTEM DESCRIPTION AND FUNCTIONAL OPERATION

3.1 TEVES ABS SYSTEM DESCRIPTION

An electronic control module is used to monitor wheel speeds and to modulate (control) hydraulic pressure in each brake channel to prevent wheel lock-up during braking.

During a non-ABS stop, the system functions as a standard front/rear split configuration. The primary supplies brake fluid pressure to the front brakes, and the secondary supplies the rear brakes. A conventional combination/proportioning valve is used.

During an ABS stop, the system still uses the front/rear hydraulic split; however, the brakes system pressure is further split into three control channels. During ABS operation, the front wheels are controlled independently and are on two separate control channels. The rear wheels are controlled together through one control channel. By using separate control channels for the front wheel, more steering control is maintained during maximum braking.

During an antilock stop, "wheel lock-up" does not necessarily mean that the wheel has locked, it means only that the wheel is turning slower than the vehicle speed. This is called "wheel slip" and is indicated as a percentage. 0% slip means that the wheel is rolling free and 100% slip means that the wheel is locked. The antilock system maintains an average of approximately 20% wheel slip.

It is important to remember that the antilock brake system does not shorten the vehicle stopping distance under all driving conditions, but provides improved control of the vehicle while stopping. Vehicle stopping distance is still dependent on vehicle speed, weight, tires, road surface, and other factors.

GENERAL INFORMATION

3.1.1 PEDAL FEEL/VEHICLE CHARACTERISTICS

There are several pedal feel/vehicle characteristics that are considered normal for antilock braking that may require further explanation.

When stopping conditions activate the antilock brakes, the driver may feel some vibrations/pulsations in the brake pedal and may hear the electric solenoid valves clicking and the pump motor running. The vibrations/pulsations are caused by the isolating, building and decaying of brake fluid pressure within the brake lines. The ABS system prevents complete wheel lock-up, but some wheel slip is required for the best braking performance. This slip may result in some tire chirping, depending on the road surface. The chirping should not be interpreted as total wheel lock-up leaves black tire marks on dry pavement, antilock braking may leave some light marks.

At the end of an ABS stop, the ABS system may not function below 5 Km/h (3 mph). There may be a slight brake pedal drop anytime the ABS is deactivated.

In case of braking on a bumpy surface, the ABS system may detect wheel locking tendencies due to wheel hop and cycle ABS. In the scenario the brake pedal may pulsate with a perceived loss of deceleration. ABS braking may also be activated at times while on dry pavement with sand, gravel, or other loose debris on the road.

It should be noted that the pulsating pedal feel characteristic will not illuminate the brake warning lamps or set a trouble code that is stored in the Controller Antilock Brake (CAB). When investigating a hard pedal feel, inspect the sensor and tone wheel teeth for chips/broken teeth, damaged sensor pole tips, excessive runout of the tone wheel, or excessive gap.

3.1.2 SYSTEM COMPONENTS

ANTILOCK BRAKE SYSTEM

- controller antilock brake (CAB)
- vacuum booster
- master cylinder (w/center valves)
- hydraulic control unit (HCU)
- valve block assembly: 6 valve solenoids (3 inlet valves, 3 outlet valves), 4 accumulators
- pump/motor assembly:
 - 1 motor
 - 2 pumps
- G (acceleration) switch
- 1 proportioning valve
- 4 wheel speed sensor/tone wheel assemblies

- ABS warning lamp
- fuses and wiring harness
- fluid reservoir (integral part of master cylinder assembly)

3.1.3 ABS AND BRAKE WARNING INDICATOR

The amber ABS warning indicator is located in the instrument cluster. It is used to inform the driver that the antilock function has been turned off due to a system malfunction. On systems the warning indicator is controlled by the CAB. On a XJ Model, the CAB controls the lamp indirectly. The ABS light relay provides a ground path for the ABS warning indicator driver. The CAB grounds the ABS light relay control circuit to turn off the indicator.

The red brake warning indicator is located in the instrument cluster. It can be activated by application of the parking brake, a leak in the front or rear wheel brake hydraulic circuit, or by turning the ignition switch to the start position.

3.1.4 CONTROLLER ANTILOCK BRAKE (CAB)

The controller antilock brake (CAB) is a microprocessor – based device that monitors wheel speeds and controls the antilock functions.

The primary functions of the CAB are:

- monitor wheel speeds
- detect wheel locking tendencies
- control fluid pressure modulation to the brakes during antilock stop operation
- monitor the system for proper operation
- provide communication to the DRB III® while in diagnostic mode
- store diagnostic information in non-volatile memory

The CAB continuously monitors the speed of each wheel. When a wheel locking tendency is detected, the CAB will command the appropriate valve to modulate brake fluid pressure in its hydraulic unit. Brake pedal position is maintained during an antilock stop by being a closed system with the use of 3 accumulators. The CAB continues to control pressure in individual hydraulic circuits until a wheel locking tendency is no longer present. The CAB turns on the pump/motor during an antilock stop.

The antilock brake system is constantly monitored by the CAB for proper operation. If the CAB detects a system malfunction, it can disable the antilock system and turn on the antilock warning lamp. If the antilock function is disabled, the system will revert to standard base brake system operation.

The CAB inputs include the following:

- four wheel speed sensors
- brake switch
- ignition switch
- battery voltage
- diagnostic communication ISO/K
- G switch (acceleration switch)

The CAB outputs include the following:

- six valve/solenoid drivers
- pump/motor actuation
- ABS warning brake actuation
- diagnostic communication

3.1.5 HYDRAULIC CONTROL UNIT

The hydraulic control unit (HCU) contains the valve block assembly, four accumulators, and the pump/motor assembly.

Valve Block Assembly: The valve block assembly contains 6 valves with three inlet valves and three outlet valves. The inlet valves are spring-loaded in the open position and the outlet valves are spring loaded in the closed position. During an antilock stop, these valves are cycled to maintain the proper slip ratio for each channel. If a wheel locks, the inlet valve is closed to prevent any further pressure increase. Then the outlet valve is opened to release the pressure to the accumulators until the wheel is no longer slipping. Once the wheel is no longer slipping, the outlet valve is closed and the inlet valve is opened to reapply pressure. If the wheel is decelerating within its predetermined limits (proper slip ratio), both valves will close to hold the pressure constant.

Pump/Motor Assembly: The pump/motor assembly provides the extra amount of fluid needed during antilock braking. The pump is supplied fluid that is released to the accumulators when the outlet valve is opened during an antilock stop. The pump is also used to drain the accumulator circuits after the antilock stop is complete. The pump is operated by an integral electric motor. This DC-type motor is controlled by the CAB. The CAB turns on the motor when an antilock stop is detected. The pump continues to run during the antilock stop and is turned off approximately 3-5 seconds after the stop is complete. The pump mechanism consists of two opposing pistons operated by an eccentric cam. One piston supplies the primary hydraulic circuit. The opposing piston supplies the secondary hydraulic circuit. In operation, one piston draws fluid from the accumulators. The opposing piston pumps fluid to the valve body solenoids. The CAB monitors the pump/motor operation internally.

Accumulators: The accumulators provide temporary fluid storage during an antilock stop and are

drained by the pump/motor. The 6mm (0.24") accumulator is used for the front brakes, the 3mm (0.12") accumulator is used for the rear brakes, the 1 mm accumulator is used for the lip seal saver, and the .5mm (0.02") accumulator is used for noise reduction.

3.1.6 SENSORS

Wheel Speed Sensors and Tone Wheels: One wheel speed sensor (WSS) is located at each wheel and sends a small AC signal to the control module (CAB). This voltage is generated by magnetic induction when a toothed sensor ring (tone wheel) passes by a stationary magnetic sensor (wheel speed sensor). The CAB converts the AC signals into digital signals for each wheel.

The front wheel sensor is attached to a boss in the steering knuckle. The tone wheel is an integral part of the front axle shaft. The rear speed sensor is mounted in the caliper adapter plate (rear disc only) and the rear tone wheel is an integral part of the rear rotor hub. The front wheel speed sensor air gap is NOT adjustable. The correct front wheel speed sensor air gap is from 0.40mm to 1.3mm (0.016" to 0.051"). Preferred rear sensor air gap for drum brake systems is 1.1mm (0.043"). Acceptable air gap range is 0.92mm to 1.275mm (0.036" to 0.050"). For rear disc brake systems, the preferred rear sensor air gap is 1.2mm (0.047"). Acceptable air gap range is 0.95mm to 1.45mm (0.037" to 0.057"). All wheel speed sensors have a resistance between 900 and 1300 ohms.

Correct antilock system operation is dependent on tone wheel speed signals from the wheel speed sensors. The vehicle's wheels and tires should all be the same size and type to generate accurate signals. In addition, the tires should be inflated to the recommended pressures for optimum system operation. Variations in wheel and tire size or significant variations in inflation pressure can produce inaccurate wheel speed signals; however, the system will continue to function when using the mini-spare. When driven over rough road surfaces, the rear wheel speed sensor signals may be erratic and cause a false trouble code (drum brakes only).

G (Acceleration) Switch: The CAB monitors the acceleration switch at all times. The switch assembly contains three mercury switches that monitor vehicle deceleration rates (G-force). Sudden, rapid changes in vehicle and wheel deceleration rate trigger the switch, sending a signal to the CAB. The switch assembly provides three deceleration rates; two for forward braking and one for rearward braking.

GENERAL INFORMATION

3.2 DIAGNOSTIC TROUBLE CODES

The Teves Mark 20 Antilock Brake System (ABS) module may report any of the following diagnostic trouble codes:

- CAB Power Feed Circuit
- Controller Failure
- G Switch Not Processable
- Left Front Sensor Circuit Failure
- Left Front Sensor Signal Failure
- Left Rear Sensor Circuit Failure
- Left Rear Sensor Signal Failure
- Pump Motor Circuit Not Working Properly
- Right Front Sensor Circuit Failure
- Right Front Sensor Signal Failure
- Right Rear Sensor Circuit Failure
- Right Rear Sensor Signal Failure
- System Overvoltage
- System Undervoltage

Diagnostic trouble codes are retained in memory until erased using the DRB III®, or automatically erased after 255 key cycles.

3.2.1 SYSTEM INITIALIZATION

System initialization starts when the key is turned to "run". At this point, the CAB performs a complete self-check of all electrical components in the antilock brake systems.

At around 12 miles per hour, the pump motor is briefly activated to ensure operation, and wheel speed sensor circuitry is checked. If for any reason your foot is on the brake when the vehicle reaches 12 mph, this check will be delayed until 25 mph. The driver may feel the test through brake pedal pulsations. This is a normal condition. Throughout the remainder of the drive cycle, ongoing tests are performed, and the CAB monitors ABS circuits for continuity.

If any component exhibits a diagnostic trouble code during system initialization or dynamic check, the CAB will illuminate the ABS warning indicator.

3.2.2 DIAGNOSTIC MODE

On a Mark 20 system to enter diagnostic mode, vehicle speed must be below 10 km/h (6 mph) and no ABS condition present. If vehicle speed is not below 10 km/h (6 mph), a "no response" message could be displayed by the DRB III®. The following are characteristics of diagnostic mode:

- The amber ABS warning indicator will blink rapidly (about 1/2 second on and 1/2 second off). If a hard trouble code is present, such as a CAB Power Feed Circuit trouble code, the indicator will

be illuminated without blinking until the diagnostic trouble code condition is corrected.

- Antilock operation is disabled.

3.2.3 INTERMITTENT DIAGNOSTIC TROUBLE CODES

If the malfunction is not present while performing a test procedure, the diagnostic procedures will not locate the problem. In this case, the code can only suggest an area to inspect. Check for the following:

- loose or corroded connections
- damaged components (sensors, tone wheels especially)
- damaged wiring
- excessive axle shaft runout
- hydraulic system leaks
- regular brake system problems, non-ABS related.

If no obvious problems are found, erase diagnostic trouble codes and, with the key on, wiggle the wire harness and connectors. Recheck for codes periodically as you work through the system. This procedure may uncover a difficult to locate malfunction.

3.3 USING THE DRB III®

Refer to the DRB III® user's guide for instructions and assistance with reading trouble codes, erasing trouble codes and other DRB III® functions.

3.4 DRB III® ERROR MESSAGES

Under normal operation, the DRB III® will display one of only two error messages:

- User-Requested WARM Boot or User-Requested COLD Boot

If the DRB III® should display any other error message, record the entire display and call the MDS Hotline for information and assistance (1-800-825-8737). This is a sample of such an error message display:

```
over: 2.14
date: 26 Jul 93
file: key_itf.cc
date: Jul 26 1993
line: 548
err: 0x1
User-Requested COLD Boot
```

Press MORE to switch between this display and the application screen.
Press F4 when done noting information.

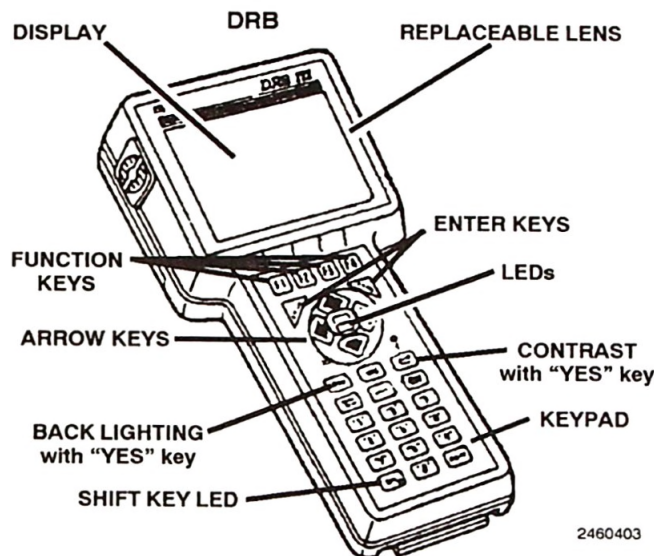
3.4.1 DRB III® DOES NOT POWER UP (BLANK SCREEN)

If the LED's do not light or no sound is emitted at start up, check for loose cable connections or a bad cable. Check the vehicle battery voltage (data link 16-way connector cavity 16). A minimum of 11 volts is required to adequately power the DRB III®. Also, check for a good ground at the DLC.

If all connections are proper between the DRB III® and the vehicle or other devices, and the vehicle battery is fully charged, and inoperative DRB III® may be the result of faulty cable or vehicle wiring.

3.4.2 DISPLAY IS NOT VISIBLE

Low temperatures will affect the visibility of the display. Adjust the contrast to compensate for this condition.



4.0 DISCLAIMERS, SAFETY WARNINGS

4.1 DISCLAIMERS

All information, illustrations, and specifications contained in this manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

4.2 SAFETY

4.2.1 TECHNICAN SAFETY INFORMATION

WARNING: ENGINES PRODUCE CARBON MONOXIDE THAT IS ODORLESS, CAUSES SLOWER REACTION TIME, AND CAN LEAD TO SERIOUS INJURY. WHEN THE ENGINE IS OPERATING, KEEP SERVICE AREAS WELL VENTILATED OR ATTACH THE VEHICLE EXHAUST SYSTEM TO THE SHOP EXHAUST REMOVAL SYSTEM.

Set the parking brake and block the wheels before testing or repairing the vehicle. It is especially important to block the wheels on four-wheel drive vehicles; the parking brake does not hold the front drive wheels.

When servicing a vehicle, always wear eye protection, and remove any metal jewelry such as watchbands or bracelets that might make an inadvertent electrical contact.

When diagnosing an antilock brake or speed proportional steering system problem, it is important to follow approved procedures where applicable. These procedures can be found in the service manual. Following these procedures is very important to the safety of individuals diagnostic tests.

4.2.2 VEHICLE PREPARATION FOR TESTING

Make sure the vehicle being tested has a fully charged battery. If it does not, false diagnostic codes or error messages may occur.

4.2.3 SERVICING SUB-ASSEMBLIES

Some components of the antilock brake or speed proportional steering system are intended to be serviced in assembly only. Attempting to remove or repair certain system sub-components may result in personal injury and/or improper system operation. Only those components with approved repair and installation procedures in the service manual should be serviced.

GENERAL INFORMATION

4.2.4 DRB III® SAFETY INFORMATION

WARNING: EXCEEDING THE LIMITS OF THE DRB III® MULTIMETER IS DANGEROUS. IT CAN EXPOSE YOU TO SERIOUS OR POSSIBLE FATAL INJURY. CAREFULLY READ AND UNDERSTAND THE CAUTIONS AND THE SPECIFICATION LIMITS.

- Follow the vehicle manufacturer's service specifications at all times.
- Do not use the DRB III® if it has been damaged.
- Do not use the test leads if the insulation is damaged or if metal is exposed.
- To avoid electrical shock, do not touch the test leads, tips, or the circuit being tested.
- Choose the proper range and function for the measurement. Do not try voltage or current measurements that may exceed the rated capacity.
- Do not exceed the limits shown in the table below:

FUNCTION	INPUT LIMIT
Volts	0 - 500 peak volts AC 0 - 500 volts DC
Ohms (resistance)*	0 - 1.12 megohms
Frequency Measured Frequency Generated	0 - 10 kHz
Temperature	-58 - 1100°F -50 - 600°C

* Ohms cannot be measured if voltage is present. Ohms can be measured only in a non-powered circuit.

- Voltage between any terminal and ground must not exceed 500v DC or 500v peak AC.
- Use caution when measuring voltage above 25v DC or 25v AC.
- Use the low current shunt to measure circuits up to 10A. Use the high current clamp to measure circuits exceeding 10A.
- When testing for the presence of voltage or current, make sure the meter is functioning correctly. Take a reading of a known voltage or current before accepting a zero reading.
- When measuring current, connect the meter in series with the load.
- Disconnect the live test lead before disconnecting the common test lead.
- When using the meter function, keep the DRB III® away from spark plug or coil wires to avoid measuring error from outside interference.

4.3 WARNING

4.3.1 VEHICLE DAMAGE WARNINGS

Before disconnecting any control module, make sure the ignition is "off". Failure to do so could damage the module.

When testing voltage or continuity at any control module, use the terminal side (not the wire end) of the connector. Do not probe a wire through the insulation; this will damage it and eventually cause it to fail because of corrosion.

Be careful when performing electrical tests so as to prevent accidental shorting of terminals. Such mistakes can damage fuses or components. Also, a second code could be set, making diagnosis of the original problem more difficult.

4.3.2 ROAD TESTING A COMPLAINT VEHICLE

Some complaints will require a test drive as part of the repair verification procedure. The purpose of the test drive is to try to duplicate the diagnostic code or symptom condition.

WARNING: BEFORE ROAD TESTING A VEHICLE, BE SURE THAT ALL COMPONENTS ARE REASSEMBLED. DURING THE TEST DRIVE, DO NOT TRY TO READ THE DRB III® SCREEN WHILE IN MOTION. DO NOT HANG THE DRB III® FROM THE REAR VIEW MIRROR OR OPERATE IT YOURSELF. HAVE AN ASSISTANT AVAILABLE TO OPERATE THE DRB III®.

4.4 DIAGNOSIS

1. Your diagnostic test procedure must begin with a thorough visual inspection of the ABS system for damaged components or disconnected connectors. The brake lamps must be operational, and if they are not, repair them prior to continuing.
2. Connect the DRB III® to the data link connector located under the dash to the left of the steering column. If the DRB III® does not power up, check the power and ground supplies to the connector.
3. Select "Antilock Brakes". Turn the ignition on. If the DRB III® displays "No Response", perform the proper test.
4. Read and record all ABS diagnostic trouble codes. If the "CAB Power Feed Circuit" trouble code is present, it must be repaired prior the addressing and other DTC's. If any additional codes are present, proceed to the appropriate test.

5. If there are no diagnostic trouble codes present, select "Inputs/Outputs" and read the brake switch input as you press and release the brake pedal. If the display does not match the state of the pedal, perform appropriate test. Read the "G-Switch" status, with the vehicle on a level surface, both switches should read "CLOSED". If the status is not correct, perform appropriate test. If a problem with the amber "ABS" warning indicator exists, refer to the system tests on the facing page.
6. If no other problem are found, it will be necessary to road test the vehicle. **THE DRB MUST NOT BE CONNECTED TO THE DATA LINK CONNECTOR WHEN ROAD TESTING FOR PROPER ANTILOCK OPERATION. THE SYSTEM IS DISABLED WHILE IN DIAGNOSTIC MODE.** Perform several antilock stops from above 50 Km/h (30 mph) and then repeat steps 2, 3, and 4. If any diagnostic trouble codes are present, proceed to the appropriate test.
7. The following conditions should be considered "NORMAL" operation, and no repairs should be attempted to correct them.
 - Brake pedal feedback during an ABS stop (clicking, vibrating)
 - Clicking, groaning or buzzing at 10 Km/h (6 mph) (drive off self test)
 - Groaning noise during an ABS stop
 - Slight brake pedal drop and pop noise when ignition is initially turned on
 - Brake pedal ratcheting down at the end of an ABS stop
8. If the complaint is ABS "cycling" at the end of a stop at low speeds, it may be caused by a marginal wheel speed sensor signal. The sensor air gap, tone wheel condition, and/or brakes hanging up are possible causes of this condition.
9. After a road test and no problems were found, refer to any Technical Service Bulletins that may apply.

5.0 REQUIRED TOOLS AND EQUIPMENT

DRBIII® (diagnostic read-out box)
 jumper wires
 ohmmeter
 voltmeter
 test lamp

6.0 GLOSSARY OF TERMS

ABS	antilock brake system
AC	alternating current
BCM	Body Control Module
CAB	controller - antilock brake
CCD	Chrysler Collision Detection
DC	direct current
DLC	data link connector
DRB	diagnostic read-out box
EDW	electrical distribution wiring
EMI	electro magnetic interference
HCU	hydraulic control unit
HZ	Hertz
ISO	International Standards Organization
JBLK	junction block
JTEC	Jeep and Truck Engine Controller
LF	left front
LR	left rear
PCM	Powertrain Control Module
PDC	power distribution center
P/M	pump motor
RF	right front
RR	right rear
RFI	radio frequency interference
SCI	Serial Communication Interface
SOL	Solenoid
WSS	Wheel Speed Sensor

NOTES

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

7.0

DIAGNOSTIC INFORMATION AND PROCEDURES

BRAKES (CAB)

Symptom:

ABS AMBER WARNING LAMP INDICATOR

POSSIBLE CAUSES
ABS LAMP RELAY CONNECTOR OBSERVABLE DEFECT
ABS LAMP RELAY CONTROL CIRCUIT OPEN
ABS LAMP RELAY CONTROL CIRCUIT SHORTED TO GROUND
ABS LAMP RELAY GROUND CIRCUIT OPEN
ABS WARNING LAMP DRIVER CIRCUIT OPEN
ABS WARNING LAMP DRIVER CIRCUIT SHORT TO GROUND
ANTILOCK BRAKE SYSTEM LAMP RELAY DEFECTIVE
CAB CONNECTOR OBSERVABLE DEFECT
CAB CONNECTOR OBSERVABLE DEFECT
INSTRUMENT CLUSTER DEFECTIVE
ANTILOCK BRAKE SYSTEM LAMP RELAY DEFECTIVE
ABS WARNING LAMP BULB DEFECTIVE
ABS WARNING LAMP STAYS ON
FUSED IGNITION SWITCH OUTPUT CKT SHORT TO GROUND
CONTROLLER ANTILOCK BRAKE DEFECTIVE
CONTROLLER ANTILOCK BRAKE DEFECTIVE
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
FUSED IGNITION SWITCH OUTPUT CIRCUIT TO LAMPS OPEN

ABS AMBER WARNING LAMP INDICATOR — Continued

TEST	ACTION	APPLICABILITY
1	<p>Ignition Off. Note: If any Trouble Codes are present, they must be repaired prior to performing this test. Ignition On, Engine Not Running. Observe the ABS Warning Indicator in the Instrument Cluster. Does the ABS Warning Indicator stay on for approximately 4 seconds then go out?</p> <p>Yes → The ABS Warning Indicator Circuit is operating properly at this time. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 2</p>	All
2	<p>Ignition Off. Note: If any Trouble Codes are present, they must be repaired prior to performing this test. Ignition On, Engine Not Running. Observe the ABS Warning Indicator in the Instrument Cluster. Is the ABS Warning Indicator on steady?</p> <p>Yes → Go To 3</p> <p>No → Go To 10</p>	All
3	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect jumper wire between ABS Light Relay Control Ckt and ground CAB Cav. 16 and 8. Ignition On, Engine Not Running. Observe the ABS Warning Lamp. Is the ABS Warning Indicator off?</p> <p>Yes → Go To 4</p> <p>No → Repair the open ABS Light Relay Control Circuit. Perform ABS Verification Test VER-1A.</p>	All
4	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Ignition On, Engine Not Running. Observe the ABS Warning Indicator in the Instrument Cluster. Is the ABS Warning Indicator on?</p> <p>Yes → Repair the ABS Warning Indicator Driver for a short to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 5</p>	All
5	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 6</p>	All

BRAKES (CAB)

ABS AMBER WARNING LAMP INDICATOR — Continued

TEST	ACTION	APPLICABILITY
6	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure across ABS Light Relay Terminals 1 and 2. Is the resistance between 70 and 80 ohms?</p> <p>Yes → Go To 7</p> <p>No → Replace the ABS Light Relay. Perform ABS Verification Test VER-1A.</p>	All
7	<p>Ignition Off. Inspect ABS/HEVAC Fuse in the Fuse Panel. Is the Fuse OK?</p> <p>Yes → Go To 8</p> <p>No → Check Fused Ignition Switch Output Circuit for a short to ground. If OK, replace the Fuse. Perform ABS Verification Test VER-1A.</p>	All
8	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure Fused Ignition Switch Output Circuit, Cavity B20. Is the voltage above 10 volts?</p> <p>Yes → Go To 9</p> <p>No → Repair open Fused Ignition Switch Output Circuit. Perform ABS Verification Test VER-1A.</p>	All
9	<p>If there are no potential causes remaining, the Controller Antilock Brake is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All
10	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 11</p>	All
11	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the Ground Circuit, Cavity 4. Is the resistance below 5 ohms?</p> <p>Yes → Go To 12</p> <p>No → Repair the open Ground Circuit. Perform ABS Verification Test VER-1A.</p>	All

ABS AMBER WARNING LAMP INDICATOR — Continued

TEST	ACTION	APPLICABILITY
12	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the ABS Light Relay Control Circuit, Cav B16. Is the voltage above 10 volts?</p> <p>Yes → Go To 13</p> <p>No → Repair open ABS Warning Indicator Driver Circuit. Perform ABS Verification Test VER-1A.</p>	All
13	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure resistance of ABS Warning Lamp Driver Circuit across the relay, Terminals 3 and 4. Is the resistance below 5 ohms?</p> <p>Yes → Go To 14</p> <p>No → Replace the ABS Light Relay. Perform ABS Verification Test VER-1A.</p>	All
14	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 15</p>	All
15	<p>Ignition Off. Disconnect the ABS Light Relay. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the ABS Light Relay Control Circuit, CAB Cav 16, and ground. Is the resistance below 5 ohms?</p> <p>Yes → Repair the ABS Relay Control Circuit for a short to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 16</p>	All
16	<p>Ignition On, Engine Not Running. Set the Parking Brake. Observe the ABS Warning Lamp in the Instrument Cluster. Is the Red Brake Warning Indicator on?</p> <p>Yes → Go To 17</p> <p>No → Repair the open Fused Ignition Switch Output Circuit to the Lamps. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

ABS AMBER WARNING LAMP INDICATOR — Continued

TEST	ACTION	APPLICABILITY
17	Ignition Off. Using a jumper wire, backprobe the ABS Warning Indicator Driver Circuit and ground at the back of Instrument Cluster Cav. 4 and Cav. 1. Ignition On, Engine Not Running. Is the ABS Warning Indicator on? Yes → Go To 18 No → Replace the Instrument Cluster. Perform ABS Verification Test VER-1A.	All
18	Ignition Off. Gain access to the ABS Warning Indicator Bulb. Is the Bulb OK? Yes → Go To 19 No → Replace the Bulb. Perform ABS Verification Test VER-1A.	All
19	If there are no potential causes remaining, the Controller Antilock Brake is assumed to be defective. View repair options. Repair Replace the CAB. Perform ABS Verification Test VER-1A.	All

Symptom:
BRAKE SWITCH CIRCUIT

POSSIBLE CAUSES

BRAKE LAMP SWITCH CONNECTOR OBSERVABLY DEFECTIVE
CAB CONNECTOR OBSERVABLE DEFECT
BRAKE LAMP SWITCH DEFECTIVE
BRAKE LAMP SWITCH OUTPUT CIRCUIT OPEN
BRAKE LAMP SWITCH OUTPUT CIRCUIT SHORT TO B+
CAB DEFECTIVE

BRAKES (CAB)

BRAKE SWITCH CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
20	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Note: Make sure the Brake Pedal is released. Ignition On, Engine Not Running. Using a Voltmeter, measure the Brake Switch Output Circuit, CAB Cavity 12. Is the voltage above 8 volts?</p> <p>Yes → Go To 21 No → Go To 25</p>	All
21	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 22</p>	All
22	<p>Ignition Off. Disconnect the Brake Switch Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 23</p>	All
23	<p>Ignition Off. Disconnect the Brake Lamp Switch Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using a Voltmeter, measure the Brake Switch Output Circuit, CAB Cavity 12. Is the voltage above 8 volts?</p> <p>Yes → Repair the Brake Switch Output Circuit for a short to B(+). Perform ABS Verification Test VER-1A. No → Go To 24</p>	All
24	<p>If there are no potential causes remaining, the Brake Lamp Switch is assumed to be defective. View repair options.</p> <p>Repair Adjust or replace the Brake Switch. Perform ABS Verification Test VER-1A.</p>	All

BRAKE SWITCH CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
25	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Note: Make sure the Brake Pedal is released. Ignition On, Engine Not Running. Using a Voltmeter, measure the Stop Lamp Switch Output Circuit, CAB Cavity 12. Depress the Brake Pedal. Is the voltage above 8 volts? Yes → Go To 26 No → Repair the open Brake Switch Output Circuit. Perform ABS Verification Test VER-1A.	All
26	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 27	All
27	If there are no potential causes remaining, the CAB is assumed to be defective. View repair options. Repair Replace the CAB. Perform ABS Verification Test VER-1A.	All

BRAKES (CAB)

Symptom:

CAB POWER FEED CIRCUIT

When Monitored and Set Condition:

CAB POWER FEED CIRCUIT

When Monitored: 1. Ignition on. 2. The CAB monitors the Fused B+ circuit at the CAB at all times for proper system voltage.

Set Condition: If the Voltage is missing when the CAB detects that an internal main driver is not on, then the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES
ABS SOLENOID/VALVE FUSE DEFECTIVE
CAB WIRING HARNESS OBSERVABLE DEFECT
HCU/PUMP DEFECTIVE
FUSED B(+) CIRCUIT OPEN
FUSED B(+) CIRCUIT SHORTED TO GROUND
CAB CONNECTOR OBSERVABLE DEFECT
CAB DEFECTIVE

CAB POWER FEED CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
28	Ignition On, Engine Not Running. With the DRB, erase ABS DTCs. Turn ignition off. Turn the ignition on. With the DRB, read ABS DTCs. Is the "CAB Power Feed Circuit Failure" code set? Yes → Go To 29 No → Go To 36	All
29	Ignition Off. Remove and inspect the ABS Solenoid Fuse. Is the Fuse okay? Yes → Go To 30 No → Go To 33	All
30	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the Fused B(+) Circuit, CAB Cavity 9. Is the voltage above 10.0 volts? Yes → Go To 31 No → Repair the open Fused B(+) Circuit. Perform ABS Verification Test VER-1A.	All
31	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 32	All
32	If there are no potential causes remaining, the CAB is assumed to be defective. View repair options. Repair Replace the CAB. Perform ABS Verification Test VER-1A.	All
33	Ignition Off. Inspect the Fused B(+) for signs of an intermittent short to ground. Is the Wiring Harness okay? Yes → Go To 34 No → Repair the Fused B(+) Circuit short to ground and replace the ABS Fuse. Perform ABS Verification Test VER-1A.	All

BRAKES (CAB)

CAB POWER FEED CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
34	Ignition Off. Remove the ABS Solenoid Fuse in PDC. Using an Ohmmeter, measure the resistance between the Fused B(+) Circuit and ground at the PDC. Is the resistance below 10 ohms? Yes → Go To 35 No → Replace the faulty ABS Fuse. Perform ABS Verification Test VER-1A.	All
35	Ignition Off. Replace the ABS Fuse with a new fuse. Ignition On, Engine Not Running. With the DRB, select System Test, actuate the Hydraulic Test. Did the ABS Fuse blow again? Yes → Replace the HCU/Pump and replace the ABS Fuse. Perform ABS Verification Test VER-1A. No → Test Complete.	All
36	Ignition Off. Using the schematic as a guide, inspect the Wiring and Connectors. Were any problems found? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Test Complete.	All

Symptom:
CONTROLLER FAILURE**When Monitored and Set Condition:****CONTROLLER FAILURE**

When Monitored: 1. Ignition on. 2. The CAB monitors its own internal microprocessors for proper operation.

Set Condition: If an error occurs within the microprocessor, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES

CAB CONNECTOR OBSERVABLE DEFECT

GROUND CIRCUIT OPEN

GROUND CIRCUIT(S) OPEN

CAB DEFECTIVE

VEHICLE ACCESSORIES CONNECTIONS OBSERVABLE DEFECT

BRAKES (CAB)

CONTROLLER FAILURE — Continued

TEST	ACTION	APPLICABILITY
37	Ignition Off. Inspect the vehicle for any accessories that have been installed. Inspect for proper power and ground connections, and/or Antenna Cable routing. Were any problems found? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 38	All
38	Ignition Off. Disconnect the CAB. Note: Check connectors - Clean/repair as necessary. Inspect the Ground Circuits, CAB Cavities 8 and 24. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 39	All
39	Ignition Off. Disconnect the CAB. Note: Check connectors - Clean/repair as necessary. Turn Ignition On, Turn On all Accessories. Using a Voltmeter, measure the Ground Circuit(s), CAB Cavity 8 or 24. Is the voltage above 1.0 volt? Yes → Repair the open Ground Circuit. Perform ABS Verification Test VER-1A. No → Go To 40	All
40	Ignition Off. Disconnect the CAB. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the CAB Ground Circuits and ground, CAB Cavities 8 and 24 and battery ground. Is the resistance below 1.0 ohms? Yes → Go To 41 No → Repair the open Ground Circuit(s). Perform ABS Verification Test VER-1A.	All
41	If there are no potential causes remaining, the CAB is assumed to be defective. View repair options. Repair Replace the CAB. Perform ABS Verification Test VER-1A.	All

Symptom:
DRB "NO RESPONSE" MESSAGE

POSSIBLE CAUSES

ABS FUSE DEFECTIVE
ABS FUSE DEFECTIVE
CAB GROUND CIRCUIT(S) OPEN
FUSED B(+) CIRCUIT OPEN
FUSED B(+) CIRCUIT SHORT TO GROUND
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
FUSED IGNITION SWITCH OUTPUT CIRCUIT SHORT TO GROUND
SCI TRANSMIT/ISO 9141K CIRCUIT OPEN
SCI TRANSMIT/ISO 9141K CIRCUIT SHORT TO GROUND
CAB CONNECTOR OBSERVABLE DEFECT
CAB DEFECTIVE
PCM DEFECTIVE

BRAKES (CAB)

DRB "NO RESPONSE" MESSAGE — Continued

TEST	ACTION	APPLICABILITY
42	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the Fused B(+) Circuit, CAB Cavity 9. Is the voltage above 10.0 volts? Yes → Go To 43 No → Go To 54	All
43	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between CAB Ground Circuits and ground CAB Cavities 8 and 24 and battery ground. Is the resistance below 1.0 ohm? Yes → Go To 44 No → Repair the open Ground Circuit(s). Perform ABS Verification Test VER-1A.	All
44	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the Fused Ignition Switch Output Circuit, CAB Cavity 23. Is the voltage above 10.0 volts? Yes → Go To 45 No → Go To 50	All
45	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 46	All
46	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the SCI Transmit/ISO 9141K Circuit, CAB Cavity 20. Is the voltage above 4.0 volts? Yes → Replace the CAB. Perform ABS Verification Test VER-1A. No → Go To 47	All

DRB "NO RESPONSE" MESSAGE — Continued

TEST	ACTION	APPLICABILITY
47	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the PCM. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the SCI Transmit/ISO 9141K Circuit, CAB Cavity 20. Is the voltage above 4.0 volts? Yes → Replace the PCM. Perform ABS Verification Test VER-1A. No → Go To 48	All
48	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the PCM. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the SCI Transmit/ISO 9141K Circuit and ground, CAB Cavities 20 and 24. Is the resistance below 5 ohms? Yes → Go To 49 No → Repair the open SCI Transmit/ISO 9141K Circuit from the CAB to the DLC. Perform ABS Verification Test VER-1A.	All
49	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the PCM. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the SCI Transmit/ISO 9141K Circuit and ground, CAB Cavities 20 and 24. Is the resistance below 5 ohms? Yes → Repair the SCI Transmit/ISO 9141K Circuit for a short to ground. Perform ABS Verification Test VER-1A. No → Test Complete.	All
50	Ignition Off. Inspect Fuse ABS/HEVAC in the Junction Block. Is the Fuse okay? Yes → Repair the open Fused Ignition Switch Output Circuit. Perform ABS Verification Test VER-1A. No → Go To 51	All
51	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 52	All

BRAKES (CAB)

DRB "NO RESPONSE" MESSAGE — Continued

TEST	ACTION	APPLICABILITY
52	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure between the Fused Ignition Switch Output Circuit and the Battery Ground. Is the resistance below 50 ohms? Yes → Repair the Fused Ignition Switch Output Circuit for a short to ground. Perform ABS Verification Test VER-1A. No → Go To 53	All
53	If there are no other potential causes remaining, the ABS Fuse is assumed to be defective. View repair options. Repair Replace the faulty Fuse. Perform ABS Verification Test VER-1A.	All
54	Ignition Off. Inspect Fuse ABS SOL in the PDC. Is the fuse okay? Yes → Repair the open Fused B(+) Circuit. Perform ABS Verification Test VER-1A. No → Go To 55	All
55	Ignition Off. Using an Ohmmeter, measure between the Fused B(+) Circuit fuse and battery ground. Is the resistance below 10 ohms? Yes → Repair the Fused B(+) Circuit for a short to ground. Perform ABS Verification Test VER-1A. No → Go To 56	All
56	If there are no other potential causes remaining, the ABS Fuse is assumed to be defective. View repair options. Repair Replace the faulty Fuse. Perform ABS Verification Test VER-1A.	All

Symptom:**G-SWITCH NOT PROCESSABLE****When Monitored and Set Condition:****G-SWITCH NOT PROCESSABLE**

When Monitored: Ignition on. The CAB sends out a test signal to the G-Switch. Then the CAB monitors the G-Switch #1 sense circuit and #2 sense circuit for voltage.

Set Condition: If either of the sense circuits are open for over 2 minutes while driving or an otherwise improper signal is detected at anytime by the CAB, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES

G-SWITCH #1 SENSE CIRCUIT SHORTED TO GROUND
G-SWITCH #2 SENSE CIRCUIT SHORTED TO GROUND
G-SWITCH TEST SIGNAL CIRCUIT SHORTED TO GROUND
CAB CONNECTOR OBSERVABLE DEFECT
G-SWITCH ASSEMBLY DEFECTIVE (TMC-15A)
G-SWITCH SENSOR ASSEMBLY NOT CONNECTED
G-SWITCH SENSOR CONNECTOR OBSERVABLE DEFECT
G-SWITCH #1 SENSE CIRCUIT OPEN
G-SWITCH #1 SENSE CIRCUIT SHORTED TO B(+)
G-SWITCH #2 SENSE CIRCUIT OPEN
G-SWITCH #2 SENSE CIRCUIT SHORTED TO B(+)
G-SWITCH TEST SIGNAL CIRCUIT OPEN
G-SWITCH TEST SIGNAL CIRCUIT SHORTED TO B(+)
CAB DEFECTIVE (G-SW #1)
CAB DEFECTIVE (G-SW #2)

BRAKES (CAB)

G-SWITCH NOT PROCESSABLE — Continued

TEST	ACTION	APPLICABILITY
57	Ignition Off. Inspect the G-Switch Sensor Assembly. Note: Check connectors - Clean/repair as necessary. Is the Sensor connected and properly mounted? Yes → Go To 58 No → Repair as necessary. Perform ABS Verification Test VER-1A.	All
58	Ignition Off. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using the DRB, read the G-Switch Status. Connect a jumper between the G-Switch #1 Sense and Test Signal, Cavities 1 and 2. Does the DRB show "G-Switch #1 Sense Closed"? Yes → Go To 59 No → Go To 70	All
59	Ignition Off. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 60	All
60	Ignition Off. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using the DRB, read the G-Switch Status. Connect a jumper between the G-Switch #2 Sense and Test Signal, Cavities 1 and 3. Does the DRB show "G-Switch #2 Sense Closed"? Yes → Replace the G-Switch Assembly. Perform ABS Verification Test VER-1A. No → Go To 61	All
61	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 62	All

G-SWITCH NOT PROCESSABLE — Continued

TEST	ACTION	APPLICABILITY
62	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the G-Switch #1 Sense Circuit, CAB Cavity 6. Is the resistance below 5 ohms?</p> <p>Yes → Repair the G-Switch #1 Sense Circuit for a short to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 63</p>	All
63	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the G-Switch #2 Sense Circuit, CAB Cavity 7. Is the resistance below 5 ohms?</p> <p>Yes → Repair the G-Switch #2 Sense Circuit for a short to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 64</p>	All
64	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the G-Switch Test Signal Circuit, CAB Cavity 13 and ground. Is the resistance below 5 ohms?</p> <p>Yes → Repair the G-Switch Test Signal Circuit for a short to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 65</p>	All
65	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of G-Switch #2 Circuit. Is the resistance below 5 ohms?</p> <p>Yes → Go To 66</p> <p>No → Repair the open G-Switch #2 Sense Circuit. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

G-SWITCH NOT PROCESSABLE — Continued

TEST	ACTION	APPLICABILITY
66	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the G-Switch #1 Sense Circuit, Cavity 2. Is there any voltage present?</p> <p>Yes → Repair the G-Switch #1 Sense Circuit for a short to B(+). Perform ABS Verification Test VER-1A.</p> <p>No → Go To 67</p>	All
67	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sense 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the G-Switch #2 Sense Circuit, Cavity 3. Is there any voltage present?</p> <p>Yes → Repair the G-Switch #2 Sense Circuit for a short to B(+). Perform ABS Verification Test VER-1A.</p> <p>No → Go To 68</p>	All
68	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the G-Switch Test Signal Circuit, Cavity 1. Is there any voltage present?</p> <p>Yes → Repair the G-Switch Test Signal Circuit for a short to B(+). Perform ABS Verification Test VER-1A.</p> <p>No → Go To 69</p>	All
69	<p>If there are no potential causes remaining, the CAB is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All
70	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the G-Switch #1 Sense Circuit, CAB. Is the resistance below 5 ohms?</p> <p>Yes → Go To 71</p> <p>No → Repair the open G-Switch #1 Sense Circuit. Perform ABS Verification Test VER-1A.</p>	All

G-SWITCH NOT PROCESSABLE — Continued

TEST	ACTION	APPLICABILITY
71	Ignition Off. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 72	All
72	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 73	All
73	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the G-Switch #1 Sense Circuit, CAB Cavity 6. Is the resistance below 5 ohms? Yes → Repair the G-Switch #1 Sense Circuit for a short to ground. Perform ABS Verification Test VER-1A. No → Go To 74	All
74	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Connect jumper wire between the G-Switch Test Signal and ground, CAB Cavities 13 and 8. Using an Ohmmeter, measure the G-Switch Test Signal, Cavity 1. Is the resistance below 5 ohms? Yes → Go To 75 No → Repair the open G-Switch Test Signal Circuit. Perform ABS Verification Test VER-1A.	All
75	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the G-Switch #2 Sense Circuit, CAB Cavity 7. Is the resistance below 5 ohms? Yes → Repair the G-Switch #2 Sense Circuit for a short to ground. Perform ABS Verification Test VER-1A. No → Go To 76	All

BRAKES (CAB)

G-SWITCH NOT PROCESSABLE — Continued

TEST	ACTION	APPLICABILITY
76	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the G-Switch Test Signal Circuit, CAB Cavity 13 and ground. Is the resistance below 5 ohms?</p> <p>Yes → Repair the G-Switch Test Signal Circuit for a short to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 77</p>	All
77	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the G-Switch #1 Sense Circuit, Cavity 2. Is there any voltage present?</p> <p>Yes → Repair the G-Switch #1 Sense Circuit for a short to B(+). Perform ABS Verification Test VER-1A.</p> <p>No → Go To 78</p>	All
78	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sense 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the G-Switch #2 Sense Circuit, Cavity 3. Is there any voltage present?</p> <p>Yes → Repair the G-Switch #2 Sense Circuit for a short to B(+). Perform ABS Verification Test VER-1A.</p> <p>No → Go To 79</p>	All
79	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the G-Switch Sensor 3-Way Connector. Note: Check connectors - Clean/repair as necessary. Ignition On, Engine Not Running. Using a Voltmeter, measure the G-Switch Test Signal Circuit, Cavity 1. Is there any voltage present?</p> <p>Yes → Repair the G-Switch Test Signal Circuit for a short to B(+). Perform ABS Verification Test VER-1A.</p> <p>No → Go To 80</p>	All
80	<p>If there are no potential causes remaining, the CAB is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All

Symptom:**LEFT FRONT SENSOR CIRCUIT FAILURE****When Monitored and Set Condition:****LEFT FRONT SENSOR CIRCUIT FAILURE**

When Monitored: 1. Ignition on. 2. The CAB monitors the wheel speed sensor circuit continuity at all times.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES

WIRING AND CONNECTORS OBSERVABLE DEFECT

WSS CONNECTOR OBSERVABLE DEFECT

WSS DAMAGED OR CONNECTOR DISCONNECTED

WSS (+) CIRCUIT OPEN

WSS (+) CIRCUIT SHORTED TO GROUND

WSS (-) CIRCUIT OPEN

WSS (-) CIRCUIT SHORTED TO GROUND

CAB DEFECTIVE

WSS DEFECTIVE (ISOLATION CHECK)

WSS DEFECTIVE (RESISTANCE CHECK)

BRAKES (CAB)

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
81	<p>Ignition On, Engine Not Running. Read and record DTC's. With the DRB, erase DTCs. Turn Ignition Off, Turn Ignition On. With the DRB, read DTC's. Did the DTC set again?</p> <p>Yes → Go To 82 No → Go To 91</p>	All
82	<p>Ignition Off. Inspect the Left Front WSS and Connector. Is the Sensor damaged or Connector disconnected?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 83</p>	All
83	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 84</p>	All
84	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Left Front WSS (+) Circuit and ground. Using an Ohmmeter, measure the resistance between the Left Front WSS (+) Circuit and ground, CAB Cavities 4 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 85 No → Repair the open Left Front WSS (+) Circuit. Perform ABS Verification Test VER-1A.</p>	All
85	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Left Front WSS (+) Circuit and ground. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Left Front WSS (+) Circuit shorted to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 86</p>	All

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
86	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between either one of the Left Front WSS Terminals and ground. Is the resistance below 15000 ohms?</p> <p>Yes → Replace the Left Front WSS. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 87</p>	All
87	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Left Front WSS (-) Circuit and ground. Using an Ohmmeter, measure the resistance between the Left Front WSS (-) Circuit and ground, CAB Cavities 11 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 88</p> <p>No → Repair the open Left Front WSS (-) Circuit. Perform ABS Verification Test VER-1A.</p>	All
88	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Left Front WSS (-) Circuit and ground. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Left Front WSS (-) Circuit shorted to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 89</p>	All
89	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Left Front WSS. Is the resistance between 900 and 1300 ohms?</p> <p>Yes → Go To 90</p> <p>No → Replace the WSS. Perform ABS Verification Test VER-1A.</p>	All
90	<p>If there are no potential causes remaining, the CAB is assumed to be defective. View repair options.</p> <p>Repair Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

LEFT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
91	Ignition Off. Using the schematic as a guide, inspect the Wiring and Connections. Were any problems found? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Test Complete.	All

Symptom:**LEFT FRONT SENSOR SIGNAL FAILURE****When Monitored and Set Condition:****LEFT FRONT SENSOR SIGNAL FAILURE**

When Monitored: Ignition on. The CAB monitors the wheel speed sensor signal at all times. 1. Comparison is checked at drive off or every 7 milliseconds. 2. Continuity is checked continuously. 3. Phase length supervision is checked every 7 milliseconds.

Set Condition: If the sensor signal is missing, as soon as vehicle speed exceeds 12 mph the DTC will set. If during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the DTC is set.

POSSIBLE CAUSES

CAB CONNECTOR OBSERVABLE DEFECT
LEFT FRONT WSS CIRCUITS SHORTED TOGETHER
LF WSS, TONE WHEEL, OR WIRING HARNESS DAMAGED
TONE WHEEL DEFECTIVE
LEFT FRONT WSS DEFECTIVE
LEFT FRONT WSS OBSERVABLE DEFECT
LEFT FRONT BRAKE PROBLEMS
LEFT FRONT WSS AIR GAP OUT OF SPECIFICATION
WHEEL BEARING CLEARANCE OUT OF SPECIFICATION

BRAKES (CAB)

LEFT FRONT SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
92	<p>Ignition On, Engine Not Running. With the DRB, read Trouble Codes. Is the Left Front Sensor Circuit failure DTC present?</p> <p>Yes → Refer to symptom LEFT FRONT SENSOR CIRCUIT FAILURE.</p> <p>No → Go To 93</p>	All
93	<p>Engine Running. Have an assistant drive the vehicle while you monitor the Left Front WSS. Slowly accelerate as straight as possible from a stop to 15 MPH. Did the Left Front WSS Signal show 0 MPH or lag behind the other sensors more than 3 MPH?</p> <p>Yes → Go To 94</p> <p>No → Go To 101</p>	All
94	<p>Ignition Off. Inspect the Tone Wheel for damaged or missing teeth. Note: The Teeth should be perfectly square, not bent or nicked. Is the Tone Wheel okay?</p> <p>Yes → Go To 95</p> <p>No → Replace the Tone Wheel. Perform ABS Verification Test VER-1A.</p>	All
95	<p>Ignition Off. Inspect the Left Front WSS. Is the WSS loose or damaged?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 96</p>	All
96	<p>Ignition Off. Using a Feeler Gauge measure the Sensor Air Gap. Note: The Air Gap should be checked in at least four places on the Tone Wheel. Is the Air Gap within 0.40 to 1.3 mm (0.016 to 0.051 in.)?</p> <p>Yes → Go To 97</p> <p>No → Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All
97	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 98</p>	All

LEFT FRONT SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
98	<p>Ignition Off. Inspect the Wheel Bearings for excessive runout or clearance. Note: Refer to appropriate service instructions if necessary for procedures or specifications. Is the Bearing clearance okay?</p> <p>Yes → Go To 99</p> <p>No → Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All
99	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Left Front WSS Circuit, CAB Cavities 4 and 11. Is the resistance below 200 ohms?</p> <p>Yes → Repair the Left Front WSS Circuits shorted together. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 100</p>	All
100	<p>If there are no potential causes remaining, the Left Front WSS is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the Left Front WSS. Perform ABS Verification Test VER-1A.</p>	All
101	<p>Ignition Off. Inspect the WSS, Tone Wheel, and Wiring Harness. Is any component damaged?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 102</p>	All
102	<p>Ignition Off Note: At this time, the Wheel Speed Sensor is ok. The Trouble Code may have been set by attempting to stop on very slick road surface or brakes locking up due to lining contamination or overheating. If any of these conditions are present, view repair options.</p> <p>Repair</p> <p>Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

Symptom:

LEFT REAR SENSOR CIRCUIT FAILURE

When Monitored and Set Condition:

LEFT REAR SENSOR CIRCUIT FAILURE

When Monitored: 1. Ignition On. 2. The CAB monitors the wheel speed sensor circuit continuity at all times.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES

WIRING AND CONNECTORS OBSERVABLE DEFECT

WSS CONNECTOR OBSERVABLE DEFECT

WSS DAMAGED OR CONNECTOR DISCONNECTED

WSS (+) CIRCUIT OPEN

WSS (+) CIRCUIT SHORTED TO GROUND

WSS (-) CIRCUIT OPEN

WSS (-) CIRCUIT SHORTED TO GROUND

CAB DEFECTIVE

WSS DEFECTIVE (ISOLATION CHECK)

WSS DEFECTIVE (RESISTANCE CHECK)

LEFT REAR SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
103	<p>Ignition On, Engine Not Running. Read and record DTC's, with the DRB erase DTC's. Turn Ignition Off, Turn Ignition On. With the DRB read DTC's. Did the DTC set again?</p> <p>Yes → Go To 104 No → Go To 113</p>	All
104	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 105</p>	All
105	<p>Ignition Off. Inspect the Left Rear WSS and Connector. Is the Sensor damaged or Connector disconnected?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 106</p>	All
106	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Left Rear WSS (+) and ground. Using an Ohmmeter, measure the resistance between the Left Rear WSS (+) Circuit and ground, CAB Cavities 10 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 107 No → Repair the open Left Rear WSS (+) Circuit. Perform ABS Verification Test VER-1A.</p>	All
107	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Left Rear WSS (+) Circuit and ground, CAB Cavities 10 and 8. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Left Rear WSS (+) Circuit shorted to ground. Perform ABS Verification Test VER-1A. No → Go To 108</p>	All

BRAKES (CAB)

LEFT REAR SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
108	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between either one of the Left Rear WSS Terminals and ground. Is the resistance below 15000 ohms?</p> <p>Yes → Replace the WSS. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 109</p>	All
109	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Left Rear WSS (-) and ground. Using an Ohmmeter, measure the resistance between the Left Rear WSS (-) Circuit and ground, CAB Cavities 2 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 110</p> <p>No → Repair the open Left Rear WSS (-) Circuit. Perform ABS Verification Test VER-1A.</p>	All
110	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Left Rear WSS (-) Circuit and ground, CAB Cavities 2 and 8. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Left Rear WSS (-) Circuit shorted to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 111</p>	All
111	<p>Ignition Off. Disconnect the Left Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Left Rear WSS. Is the resistance between 900 and 1300 ohms?</p> <p>Yes → Go To 112</p> <p>No → Replace the WSS. Perform ABS Verification Test VER-1A.</p>	All
112	<p>If there are no potential causes remaining, the CAB is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All

LEFT REAR SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
113	<p>Ignition Off. Using the schematic as a guide, inspect the wiring and connections. Were any problems found?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Test Complete.</p>	All

BRAKES (CAB)

Symptom:

LEFT REAR SENSOR SIGNAL FAILURE

When Monitored and Set Condition:

LEFT REAR SENSOR SIGNAL FAILURE

When Monitored: 1. Ignition on. 2. The CAB monitors the WS signals at all times. 3. Wheel Speed comparison is checked at drive off or every 7 millisec. 4. Wheel Speed continuity is checked continuously. 5. Wheel Speed phase length supervision is checked every 7 millisec.

Set Condition: If the sensor signal is missing, as soon as vehicle speed exceeds 12 mph the DTC will set. If during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the DTC is set.

POSSIBLE CAUSES

CAB CONNECTOR OBSERVABLE DEFECT

LEFT REAR WSS CIRCUITS SHORTED TOGETHER

LEFT REAR WSS, TONE WHEEL, OR WIRING HARNESS DAMAGED

TONE WHEEL DEFECTIVE

LEFT REAR WSS DEFECTIVE

LEFT REAR WSS OBSERVABLE DEFECT

LEFT REAR BRAKE PROBLEMS

LEFT REAR WHEEL BEARING CLEARANCE OUT OF SPEC

LEFT REAR WSS AIR GAP OUT OF SPECIFICATION

LEFT REAR SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
114	<p>Ignition On, Engine Not Running. With DRB, read Trouble Codes. Is the Left Rear Sensor Circuit failure DTC present?</p> <p>Yes → Refer to symptom LEFT REAR SENSOR CIRCUIT FAILURE.</p> <p>No → Go To 115</p>	All
115	<p>Engine Running. Have an assistant drive the vehicle while you monitor the Left Rear WSS. Slowly accelerate as straight as possible from a stop to 15 MPH. Did the Left Rear WSS show 0 MPH or lag behind the other sensors more than 3 MPH?</p> <p>Yes → Go To 116</p> <p>No → Go To 123</p>	All
116	<p>Ignition Off. Inspect Tone Wheel for damaged or missing teeth. Note: The teeth should be perfectly square, not bent or nicked. Is the Tone Wheel okay?</p> <p>Yes → Go To 117</p> <p>No → Replace the Tone Wheel. Perform ABS Verification Test VER-1A.</p>	All
117	<p>Ignition Off. Inspect the Left Rear WSS. Is the WSS loose or damaged?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 118</p>	All
118	<p>Ignition Off. Inspect the Wheel Bearings for excessive runout or clearance. Note: Refer to appropriate service instructions if necessary for procedures or specifications. Is the Bearing Clearance okay?</p> <p>Yes → Go To 119</p> <p>No → Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All
119	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 120</p>	All

BRAKES (CAB)

LEFT REAR SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
120	<p>Ignition Off. Using a feeler gauge, measure the Sensor Air Gap. Note: The Air Gap should be checked at least in four places on the Tone Wheel. Is the Air Gap within 0.92 to 1.45 mm (0.036 to 0.057 in.)?</p> <p>Yes → Go To 121</p> <p>No → Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All
121	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Left Rear WSS Circuit, CAB Cavities 2 and 10. Is the resistance below 200 ohms?</p> <p>Yes → Repair the Left Rear WSS Circuits, shorted together. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 122</p>	All
122	<p>If there are no potential causes remaining, the Left Rear WSS is assumed to be defective. View repair options.</p> <p>Repair Replace the Left Rear WSS. Perform ABS Verification Test VER-1A.</p>	All
123	<p>Ignition Off. Inspect WSS, Tone Wheel, and Wiring Harness. Is any component damaged?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 124</p>	All
124	<p>Ignition Off Note: At this time, the Wheel Speed Sensor is ok. The Trouble Code may have been set by attempting to stop on very slick road surface or brakes locking up due to lining contamination or overheating. If any of these conditions are present, view repair options.</p> <p>Repair Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All

Symptom:**PUMP MOTOR CIRCUIT NOT WORKING PROPERLY****When Monitored and Set Condition:****PUMP MOTOR CIRCUIT NOT WORKING PROPERLY**

When Monitored: Ignition on. The CAB monitors the pump at all times. The CAB commands the pump on at 12 mph to check its operation, provided the brake is not applied. If the driver has their foot on the brake, the test will run at 24 mph.

Set Condition: The DTC is stored when the CAB detects that the pump cannot run when commanded on OR is running erroneously. If the pump is off at the end of an ABS stop when the pump is commanded on, or if the pump is on when the pump is commanded off, the DTC is set.

POSSIBLE CAUSES

ABS PUMP MOTOR FUSE DEFECTIVE

CAB GROUND CIRCUIT(S) OPEN

FUSED B(+) CIRCUIT OPEN

PUMP MOTOR WIRING HARNESS OBSERVABLE DEFECT

PUMP MOTOR/HCU DEFECTIVE

PUMP MOTOR/CAB CONNECTOR(S) OBSERVABLE DEFECT

CAB DEFECTIVE (1)

CAB DEFECTIVE (2)

BRAKES (CAB)

PUMP MOTOR CIRCUIT NOT WORKING PROPERLY — Continued

TEST	ACTION	APPLICABILITY
125	Ignition On, Engine Not Running With the DRB, read the DTCs. Is the CAB Power Feed Circuit code present? Yes → Refer to symptom CAB POWER FEED CIRCUIT. No → Go To 126	All
126	Ignition On, Engine Not Running With the DRB, erase DTCs. Turn ignition off. Turn ignition on. Read the DTCs. Did "Pump Motor Circuit Not Working Properly" return? Yes → Go To 129 No → Go To 127	All
127	Ignition On, Engine Not Running With the DRB under "Actuators" select "Pump". Place your hand on pump, then enable pump to operate with DRB. Did Pump Motor operate? Yes → Go To 128 No → Go To 129	All
128	Ignition Off Using the schematic as a guide, inspect the Wiring and Connections. Were any problems found? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Test Complete.	All
129	Ignition Off Check the ABS Motor Fuse in the PDC. Is the Fuse okay? Yes → Go To 130 No → Check for short to ground in Fused B(+) Circuit. If no short is found, replace the faulty ABS Fuse. Perform ABS Verification Test VER-1A.	All
130	Ignition On, Engine Not Running With the DRB under "Actuators" select "Pump". Place your hand on pump, then enable pump to operate with DRB. Is the Pump/Motor running continuously? Yes → Replace the CAB. Perform ABS Verification Test VER-1A. No → Go To 131	All

PUMP MOTOR CIRCUIT NOT WORKING PROPERLY — Continued

TEST	ACTION	APPLICABILITY
131	<p>Ignition Off Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, connect probes between the CAB Ground Circuits and ground, CAB Cavities 8 and 24 and battery ground. Is the resistance below 1.0 ohms?</p> <p>Yes → Go To 132</p> <p>No → Repair the open Ground Circuit or poor connection. Perform ABS Verification Test VER-1A.</p>	All
132	<p>Ignition Off Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Ignition on. Using a Voltmeter, measure the Fused B(+) Circuit, CAB Cavity 25. Is the voltage above 10.0 volts?</p> <p>Yes → Go To 133</p> <p>No → Repair the open Fused B(+) Circuit. Perform ABS Verification Test VER-1A.</p>	All
133	<p>Ignition Off Disconnect the Pump Motor Two Terminal Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect jumper wire between CAB Cavity 25 and Pump Motor Relay Output. With the DRB, Connect another jumper wire between CAB Cavity 24 and Pump Motor Relay ground. Is the Pump Motor operating properly?</p> <p>Yes → Go To 134</p> <p>No → Replace the Pump Motor/HCU. Perform ABS Verification Test VER-1A.</p>	All
134	<p>Ignition Off Disconnect the Pump Motor Two Terminal Connector from CAB. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Are any Terminals damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 135</p>	All
135	<p>If there are no potential causes remaining, the CAB is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

Symptom:

RED BRAKE WARNING LAMP

POSSIBLE CAUSES

BRAKE WARNING LAMP SWITCH CONNECTOR OBSERVABLE DEF
FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
INSTRUMENT CLUSTER DEFECTIVE
RED BRAKE WARNING LAMP BULB DEFECTIVE
PARKING BRAKE ON AND/OR FLUID LEVEL LOW
IGNITION SWITCH CONNECTOR OBSERVABLE DEFECT (1)
IGNITION SWITCH CONNECTORS OBSERVABLE DEFECT (2)
BRAKE WARNING SWITCH DEFECTIVE (1)
BRAKE WARNING SWITCH DEFECTIVE (2)
IGNITION SWITCH DEFECTIVE (1)
IGNITION SWITCH DEFECTIVE (2)
PARK BRAKE SWITCH DEFECTIVE (1)
PARK BRAKE SWITCH DEFECTIVE (2)
RED BRAKE WARNING LAMP CIRCUIT SHORT TO GROUND
RED BRAKE WARNING LAMP DRIVER CIRCUIT OPEN (1)
RED BRAKE WARNING LAMP DRIVER CIRCUIT OPEN (2)
RED BRAKE WARNING LAMP DRIVER CIRCUIT OPEN (3)

RED BRAKE WARNING LAMP — Continued

TEST	ACTION	APPLICABILITY
136	Ignition Off. Observe the Red Brake Warning Indicator in the Instrument Cluster. Is the Red Brake Warning Indicator on always? Yes → Go To 137 No → Go To 143	All
137	Ignition Off. Completely release the Parking Brake. Inspect the Brake Warning Indicator Switch in the Proportioning Valve. Was the Parking Brake on or the Fluid Level low? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 138	All
138	Ignition Off. Disconnect the Ignition Switch Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 139	All
139	Ignition Off. Note: Ensure the Ignition Switch is connected. Disconnect the Brake Warning Switch. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire across the Brake Warning Indicator Switch Terminals. Turn ignition on. Is the Red Brake Warning Indicator on? Yes → Go To 140 No → Replace the Brake Warning Indicator Switch. Perform ABS Verification Test VER-1A.	All
140	Ignition Off. Disconnect the Brake Warning Switch. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire across the Brake Warning Indicator Switch Terminals. Disconnect the Park Brake Switch. Note: Check connectors - Clean/repair as necessary. Disconnect Ignition Switch Connector. Note: Check connectors - Clean/repair as necessary. Use a jumper wire to connect the Fused B+ Circuit to the Fused Ignition Switch Output (Run/Start) Circuit. Is the Red Brake Warning Indicator on? Yes → Repair the Red Brake Warning Indicator Circuit shorted to ground. Perform ABS Verification Test VER-1A. No → Go To 141	All

BRAKES (CAB)

RED BRAKE WARNING LAMP — Continued

TEST	ACTION	APPLICABILITY
141	<p>Ignition Off. Disconnect the Brake Warning Switch. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire across the Brake Warning Lamp Switch. Disconnect the Park Brake Switch. Note: Check connectors - Clean/repair as necessary. Is the Red Brake Warning Indicator on?</p> <p>Yes → Go To 142</p> <p>No → Replace the Park Brake Switch. Perform ABS Verification Test VER-1A.</p>	All
142	<p>If there are no potential causes remaining, the Ignition Switch is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the Ignition Switch. Perform ABS Verification Test VER-1A.</p>	All
143	<p>Ignition Off. Turn the Ignition Switch to the start position and observe the Red Brake Warning Indicator. Was the Red Brake Warning Indicator on when the Ignition Switch was in the start position?</p> <p>Yes → Go To 144</p> <p>No → Go To 152</p>	All
144	<p>Ignition Off. Observe the Yellow ABS Warning Indicator in the Instrument Cluster. Does the Yellow ABS Warning Indicator operate?</p> <p>Yes → Go To 145</p> <p>No → Repair the open Fused Ignition Switch Output Circuit to the Warning Lamps. Perform ABS Verification Test VER-1A.</p>	All
145	<p>Ignition Off. Disconnect the Brake Warning Indicator Switch Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 146</p>	All
146	<p>Ignition Off. Disconnect the Brake Warning Lamp Switch Connector. Note: Check connectors - Clean/repair as necessary. Using a Voltmeter, measure the Red Brake Warning Indicator Driver Circuit, Cavity 2. Is the voltage above 10 volts?</p> <p>Yes → Go To 147</p> <p>No → Repair the open Red Brake Warning Indicator Driver Circuit. Perform ABS Verification Test VER-1A.</p>	All

RED BRAKE WARNING LAMP — Continued

TEST	ACTION	APPLICABILITY
147	<p>Ignition Off. Disconnect the Brake Warning Lamp Switch Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire across the Brake Warning Indicator Switch Harness, completely release Park Brake. Using a Voltmeter, backprobe and measure Red Brake Warning Indicator Driver Ckt at Park Brake. Is the voltage above 10 volts?</p> <p>Yes → Go To 148</p> <p>No → Repair the open Red Brake Warning Indicator Driver Circuit. Perform ABS Verification Test VER-1A.</p>	All
148	<p>Ignition Off. Disconnect the Brake Warning Lamp Switch Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire across the Brake Warning Indicator Switch Terminals. Apply the Park Brake. Using a Voltmeter, measure the Red Brake Warning Indicator Driver Circuit at Park Brake. Is the voltage above 10 volts?</p> <p>Yes → Replace the Park Brake Switch. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 149</p>	All
149	<p>Ignition Off. Gain access to the Red Brake Warning Indicator Bulb. Is the Bulb OK?</p> <p>Yes → Go To 150</p> <p>No → Replace the faulty Bulb. Perform ABS Verification Test VER-1A.</p>	All
150	<p>Ignition Off. Backprobe the Instrument Cluster Left Connector with a jumper wire between the Red Warning Indicator Driver Circuit and ground, Cav. 2. Ignition On, Engine Not Running. Observe the Red Brake Warning Indicator in the Instrument Cluster. Is the Red Brake Warning Indicator on?</p> <p>Yes → Go To 151</p> <p>No → Replace the Instrument Cluster. Perform ABS Verification Test VER-1A.</p>	All
151	<p>If there are no potential causes remaining, the Brake Warning Switch is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the Brake Warning Indicator Switch. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

RED BRAKE WARNING LAMP — Continued

TEST	ACTION	APPLICABILITY
152	Ignition Off. Observe the Yellow ABS Warning Indicator in the Instrument Cluster. Does the Yellow ABS Warning Indicator operate? Yes → Go To 153 No → Repair the open Fused Ignition Switch Output Circuit to the Warning Lamps. Perform ABS Verification Test VER-1A.	All
153	Ignition Off. Disconnect the Ignition Switch. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 154	All
154	Ignition Off. Disconnect the Ignition Switch. Note: Check connectors - Clean/repair as necessary. Using a jumper wire, backprobe the Red Brake Warning Indicator Driver Circuit, Cav. 2. Reconnect Ignition Switch. Ignition On, Engine Not Running. Using a Voltmeter, measure Red Brake Warning Indicator Driver. Is the voltage above 10 volts? Yes → Go To 155 No → Repair the open Red Brake Warning Indicator Driver Circuit. Perform ABS Verification Test VER-1A.	All
155	Ignition Off. Gain access to the Red Brake Warning Indicator Bulb. Is the Bulb OK? Yes → Go To 156 No → Replace the faulty Bulb. Perform ABS Verification Test VER-1A.	All
156	Ignition Off. Backprobe the Instrument Cluster Left Connector with a jumper wire between the Red Warning Indicator Driver Circuit and ground, Cav. 2. Ignition On, Engine Not Running. Observe the Red Brake Warning Indicator in the Instrument Cluster. Is the Red Brake Warning Indicator on? Yes → Go To 157 No → Replace the Instrument Cluster. Perform ABS Verification Test VER-1A.	All

RED BRAKE WARNING LAMP — Continued

TEST	ACTION	APPLICABILITY
157	<p>If there are no potential causes remaining, the Ignition Switch is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the Ignition Switch. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

Symptom:

RIGHT FRONT SENSOR CIRCUIT FAILURE

When Monitored and Set Condition:

RIGHT FRONT SENSOR CIRCUIT FAILURE

When Monitored: 1. Ignition on. 2. The CAB monitors the wheel speed sensor circuit continuity at all times.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES

WIRING AND CONNECTORS OBSERVABLE DEFECT

WSS CONNECTOR OBSERVABLE DEFECT

WSS DAMAGED OR CONNECTOR DISCONNECTED

WSS (+) CIRCUIT OPEN

WSS (+) CIRCUIT SHORTED TO GROUND

WSS (-) CIRCUIT OPEN

WSS (-) CIRCUIT SHORTED TO GROUND

CAB DEFECTIVE

WSS DEF (ISOL CKT)

WSS DEF (RES CKT)

RIGHT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
158	<p>Ignition On, Engine Not Running Read and record the DTC's, with the DRB erase DTC's. Turn ignition off, turn ignition on. With the DRB, read DTC's. Did the DTC set again?</p> <p>Yes → Go To 159 No → Go To 169</p>	All
159	<p>Ignition Off Disconnect the Right Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 160</p>	All
160	<p>Ignition Off Inspect the Right Front WSS and Connector. Is the Sensor damaged or Connector disconnected?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 161</p>	All
161	<p>Ignition Off Disconnect the Right Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Right Front WSS (+) Circuit and ground. Using an Ohmmeter, measure the resistance between the Right Front WSS (+) Circuit and ground, CAB Cavities 3 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 162 No → Repair the open Right Front WSS (+) Circuit. Perform ABS Verification Test VER-1A.</p>	All
162	<p>Ignition Off Disconnect the Right Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Right Front WSS (+) Circuit and ground, CAB Cavities 3 and 8. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Right Front WSS (+) Circuit shorted to ground. Perform ABS Verification Test VER-1A. No → Go To 163</p>	All

BRAKES (CAB)

RIGHT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
163	<p>Ignition Off. Disconnect the Right Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between either one of the Left Front WSS Terminals and ground. Is the resistance below 15000 ohms?</p> <p>Yes → Replace the Right Front Wheel Speed Sensor.</p> <p>No → Go To 164</p>	All
164	<p>Ignition Off Disconnect the Right Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Right Front WSS (-) Circuit and ground. Using an Ohmmeter, measure the resistance between the Right Front WSS (-) Circuit and ground, CAB Cavities 18 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 165</p> <p>No → Repair the open Right Front WSS (-) Circuit. Perform ABS Verification Test VER-1A.</p>	All
165	<p>Ignition Off Disconnect the Right Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Right Front WSS (-) Circuit and ground, CAB Cavities 18 and 8. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Right Front WSS (-) Circuit shorted to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 166</p>	All
166	<p>Ignition Off. Disconnect the Left Front WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Right Front WSS. Is the resistance between 900 and 1300 ohms?</p> <p>Yes → Go To 167</p> <p>No → Replace the Wheel Speed Sensor.</p>	All
167	<p>Ignition Off At this time, the condition required to set the trouble code is not present. Using the schematic as a guide, inspect the Wiring and Connections. Were any problems found?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 168</p>	All

RIGHT FRONT SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
168	If there are no potential causes remaining, the CAB is assumed to be defective. View repair options. Repair Replace the CAB. Perform ABS Verification Test VER-1A.	All
169	Ignition Off At this time, the condition required to set the trouble code is not present. Using the schematic as a guide, inspect the Wiring and Connections. Were any problems found? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Test Complete.	All

Symptom:

RIGHT FRONT SENSOR SIGNAL FAILURE

When Monitored and Set Condition:

RIGHT FRONT SENSOR SIGNAL FAILURE

When Monitored: 1. Ignition on. 2. The CAB monitors the WS signals at all times. 3. Wheel Speed comparison is checked at drive off or every 7 millisec. 4. Wheel Speed continuity is checked continuously. 5. Wheel Speed phase length supervision is checked every 7 millisec.

Set Condition: If the sensor signal is missing, as soon as vehicle speed exceeds 12 mph the DTC will set. If during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the DTC is set.

POSSIBLE CAUSES

CAB CONNECTOR OBSERVABLE DEFECT
RIGHT FRONT WSS CIRCUITS SHORTED TOGETHER
RIGHT FRONT WSS, TONE WHEEL, OR WIR HARN DAMAGED
TONE WHEEL DEFECTIVE
RIGHT FRONT WSS DEFECTIVE
RIGHT FRONT WSS OBSERVABLE DEFECT
RIGHT FRONT BRAKE PROBLEMS
RIGHT FRONT WSS AIR GAP OUT OF SPECIFICATION
WHEEL BEARING CLEARANCE OUT OF SPECIFICATION

RIGHT FRONT SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
170	Ignition On, Engine Not Running. With DRB read trouble codes. Is the Right Front Sensor Circuit failure DTC present? Yes → Refer to symptom RIGHT FRONT SENSOR CIRCUIT FAILURE. No → Go To 171	All
171	Ignition On, Engine Not Running. Have an assistant drive the vehicle while you monitor the Right Front WSS. Slowly accelerate as straight as possible from a stop to 15 MPH. Did the Right Front WSS Signal show 0 MPH or lag behind the other sensors more than 3 MPH. Yes → Go To 172 No → Go To 179	All
172	Ignition Off. Inspect the Tone Wheel for damaged or missing teeth. Note: The teeth should be perfectly square, not bent or nicked. Is the Tone Wheel okay? Yes → Go To 173 No → Replace the Tone Wheel. Perform ABS Verification Test VER-1A.	All
173	Ignition Off. Inspect the Right Front WSS. Is the WSS loose or damaged? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 174	All
174	Ignition Off. Using a Feeler Gauge measure the Sensor Air Gap. Note: The Air Gap should be checked at least in four places on the Tone Wheel. Is the Air Gap within 0.40 to 1.3 mm (0.016 to 0.051 in.)? Yes → Go To 175 No → Repair as necessary. Perform ABS Verification Test VER-1A.	All
175	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminals damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 176	All

BRAKES (CAB)

RIGHT FRONT SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
176	Ignition Off. Inspect the Wheel Bearings for excessive runout or clearance. Note: Refer to the appropriate service instructions if necessary for procedures or specifications. Is the Bearing Clearance okay? Yes → Go To 177 No → Repair as necessary. Perform ABS Verification Test VER-1A.	All
177	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Right Front WSS Circuit, CAB Cavities 3 and 18. Is the resistance below 200 ohms? Yes → Repair the Right Front WSS Circuits shorted together. Perform ABS Verification Test VER-1A. No → Go To 178	All
178	If there are no potential causes remaining, the Right Front WSS is assumed to be defective. View repair options. Repair Replace the Right Front WSS. Perform ABS Verification Test VER-1A.	All
179	Ignition Off. Inspect the WSS, Tone Wheel, and Wiring Harness. Is any component damaged? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 180	All
180	Ignition Off Note: At this time, the Wheel Speed Sensor is ok. The Trouble Code may have been set by attempting to stop on very slick road surface or brakes locking up due to lining contamination or overheating. If any of these conditions are present, view repair options. Repair Repair as necessary. Perform ABS Verification Test VER-1A.	All

Symptom:**RIGHT REAR SENSOR CIRCUIT FAILURE****When Monitored and Set Condition:****RIGHT REAR SENSOR CIRCUIT FAILURE**

When Monitored: 1. Ignition on. 2. The CAB monitors the wheel speed sensor circuit continuity at all times.

Set Condition: If the CAB detects an open or shorted wheel speed sensor circuit, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES

WIRING AND CONNECTORS OBSERVABLE DEFECT

WSS CONNECTOR OBSERVABLE DEFECT

WSS DAMAGED OR CONNECTOR DISCONNECTED

WSS (+) CIRCUIT OPEN

WSS (+) CIRCUIT SHORTED TO GROUND

WSS (-) CIRCUIT OPEN

WSS (-) CIRCUIT SHORTED TO GROUND

CAB DEFECTIVE

WSS DEFECTIVE (ISOLATION CHECK)

WSS DEFECTIVE (RESISTANCE CHECK)

BRAKES (CAB)

RIGHT REAR SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
181	Ignition On, Engine Not Running. Read and record DTC's. With the DRB erase DTC's. Turn Ignition Off, Turn Ignition On. With the DRB read DTC's. Did the DTC set again? Yes → Go To 182 No → Go To 191	All
182	Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out, or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 183	All
183	Ignition Off. Inspect the Right Rear WSS and Connector. Is the Sensor damaged or Connector disconnected? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 184	All
184	Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Right Rear WSS (+) and ground. Using an Ohmmeter, measure the resistance between the Right Rear WSS (+) Circuit and ground, CAB Cavities 17 and 8. Is the resistance below 5 ohms? Yes → Go To 185 No → Repair the open Right Rear WSS (+) Circuit. Perform ABS Verification Test VER-1A.	All
185	Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Right Rear WSS (+) Circuit and ground, CAB Cavities 17 and 24. Is the resistance below 15000 ohms? Yes → Repair the Right Rear WSS (+) Circuit shorted to ground. Perform ABS Verification Test VER-1A. No → Go To 186	All

RIGHT REAR SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
186	<p>Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between either one of the Right Rear WSS Terminals and ground. Is the resistance below 15000 ohms?</p> <p>Yes → Replace the WSS. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 187</p>	All
187	<p>Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Connect a jumper wire between the Right Rear WSS (-) and ground. Using an Ohmmeter, measure the resistance between the Right Rear WSS (-) Circuit and ground, CAB Cavities 1 and 8. Is the resistance below 5 ohms?</p> <p>Yes → Go To 188</p> <p>No → Repair the open Right Rear WSS (-) Circuit. Perform ABS Verification Test VER-1A.</p>	All
188	<p>Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance between the Right Rear WSS (-) Circuit and ground, CAB Cavities 1 and 8. Is the resistance below 15000 ohms?</p> <p>Yes → Repair the Right Rear WSS (-) Circuit shorted to ground. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 189</p>	All
189	<p>Ignition Off. Disconnect the Right Rear WSS Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Right Rear WSS. Is the resistance between 900 and 1300 ohms?</p> <p>Yes → Go To 190</p> <p>No → Replace the WSS. Perform ABS Verification Test VER-1A.</p>	All
190	<p>If there are no potential causes remaining, the CAB is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the CAB. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

RIGHT REAR SENSOR CIRCUIT FAILURE — Continued

TEST	ACTION	APPLICABILITY
191	Ignition Off. Using the schematic as a guide, inspect the Wiring and Connections. Were any problems found? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Test Complete.	All

Symptom:**RIGHT REAR SENSOR SIGNAL FAILURE****When Monitored and Set Condition:****RIGHT REAR SENSOR SIGNAL FAILURE**

When Monitored: 1. Ignition on. 2. The CAB monitors the WS signals at all times. 3. Wheel Speed comparison is checked at drive off or every 7 millisec. 4. Wheel Speed continuity is checked continuously. 5. Wheel Speed phase length supervision is checked every 7 millisec.

Set Condition: If the sensor signal is missing, as soon as vehicle speed exceeds 12 mph the DTC will set. If during an ABS stop, the CAB commands any valve solenoid on for an extended length of time, and does not see a corresponding wheel speed change, the DTC is set.

POSSIBLE CAUSES

CAB CONNECTOR OBSERVABLE DEFECT

RIGHT REAR WSS CIRCUITS SHORTED TOGETHER

RIGHT REAR WSS, TONE WHEEL, OR WIRING HARN DAMAGED

TONE WHEEL DEFECTIVE

RIGHT REAR WSS DEFECTIVE

RIGHT REAR WSS OBSERVABLE DEFECT

RIGHT REAR BRAKE PROBLEMS

RIGHT REAR WHEEL BEARING CLEARANCE OUT OF SPEC

RIGHT REAR WSS AIR GAP OUT OF SPECIFICATION

BRAKES (CAB)

RIGHT REAR SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
192	Ignition On, Engine Not Running. With DRB, read Trouble Codes. Is the Right Rear Sensor Circuit failure DTC present? Yes → Refer to symptom RIGHT REAR SENSOR CIRCUIT FAILURE. No → Go To 193	All
193	Engine Running. Have an assistant drive the vehicle while you monitor the Right Rear WSS. Slowly accelerate as straight as possible from a stop to 15 MPH. Did the Right Rear WSS Signal show 0 MPH or lag behind the other sensors more than 3 MPH? Yes → Go To 194 No → Go To 201	All
194	Ignition Off. Inspect the Tone Wheel for damaged or missing teeth. Note: The teeth should be perfectly square, not bent or nicked. Is the Tone Wheel okay? Yes → Go To 195 No → Replace the Tone Wheel. Perform ABS Verification Test VER-1A.	All
195	Ignition Off. Inspect the Right Rear WSS. Is the WSS loose or damaged? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 196	All
196	Ignition Off. Inspect the Wheel Bearings for excessive runout or clearance. Note: Refer to the service manual if necessary for procedures and specifications. Is the Bearing Clearance okay? Yes → Go To 197 No → Repair as necessary. Perform ABS Verification Test VER-1A.	All
197	Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired? Yes → Repair as necessary. Perform ABS Verification Test VER-1A. No → Go To 198	All

RIGHT REAR SENSOR SIGNAL FAILURE — Continued

TEST	ACTION	APPLICABILITY
198	<p>Ignition Off. Using a feeler gauge, measure the Sensor Air Gap. Note: The Air Gap should be checked at least in four places on the Tone Wheel. Is the Air Gap within 0.92 to 1.45 mm (0.036 to 0.057 in.)?</p> <p>Yes → Go To 199</p> <p>No → Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All
199	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Using an Ohmmeter, measure the resistance of the Right Rear WSS Circuit, CAB Cavities 1 and 17. Is the resistance below 200 ohms?</p> <p>Yes → Repair the Right Rear WSS Circuits, shorted together. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 200</p>	All
200	<p>If there are no potential causes remaining, the Right Rear WSS is assumed to be defective. View repair options.</p> <p>Repair</p> <p>Replace the Right Rear WSS. Perform ABS Verification Test VER-1A.</p>	All
201	<p>Ignition Off. Inspect the WSS, Tone Wheel, and Wiring Harness. Is any component damaged?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 202</p>	All
202	<p>Ignition Off Note: At this time, the Wheel Speed Sensor is ok. The Trouble Code may have been set by attempting to stop on very slick road surface or brakes locking up due to lining contamination or overheating. If any of these conditions are present, view repair options.</p> <p>Repair</p> <p>Repair as necessary. Perform ABS Verification Test VER-1A.</p>	All

BRAKES (CAB)

Symptom:

SYSTEM OVERVOLTAGE

When Monitored and Set Condition:

SYSTEM OVERVOLTAGE

When Monitored: 1. Ignition on. 2. The CAB monitors the Fused B+ Circuit at all times for proper system voltage.

Set Condition: If the voltage is above 19 volts at the CAB, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES
BATTERY CHARGER CONNECTED
CHARGING SYSTEM VOLTAGE ABOVE 16.5 VOLTS
CAB CONNECTOR OBSERVABLE DEFECT
CAB DEFECTIVE

SYSTEM OVERVOLTAGE — Continued

TEST	ACTION	APPLICABILITY
203	<p>Is a Battery Charger connected to the Vehicle?</p> <p>Yes → Charge Battery to proper level, Disconnect the Charger and clear Trouble Codes. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 204</p>	All
204	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Engine Running. Raise the RPM's to above 1800. Using a Voltmeter, measure the Fused Ignition Switch Output Circuit CAB Cavity 23. Is the voltage above 16.5 volts?</p> <p>Yes → Refer to appropriate service instructions for Charging System testing and repair. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 205</p>	All
205	<p>Ignition Off. Disconnect the CAB Connector. Note: Check connectors - Clean/repair as necessary. Inspect all Terminals. Is any Terminal damaged, pushed out or miswired?</p> <p>Yes → Repair as necessary. Perform ABS Verification Test VER-1A.</p> <p>No → Go To 206</p>	All
206	<p>Using the DRB, erase the DTC's. Engine Running. Did the DTC reset?</p> <p>Yes → Replace the CAB. Perform ABS Verification Test VER-1A.</p> <p>No → Test Complete.</p>	All

BRAKES (CAB)

Symptom:

SYSTEM UNDERVOLTAGE

When Monitored and Set Condition:

SYSTEM UNDERVOLTAGE

When Monitored: 1. Ignition on. 2. The CAB monitors the voltage at the Fused Ignition Switch Output Circuit at all times above 10 km/h (6 mph) for proper system voltage.

Set Condition: If the voltage is below 9 volts on the Fused Ignition Switch Output Circuit at the CAB, the diagnostic trouble code (DTC) is set.

POSSIBLE CAUSES
FUSED IGNITION SWITCH OUTPUT CKT HIGH RESISTANCE
BATTERY VOLTAGE BELOW 13 VOLTS

SYSTEM UNDERVOLTAGE — Continued

TEST	ACTION	APPLICABILITY
207	Engine Running. With the DRB, select Sensors, read the "ignition voltage" and record. With a Voltmeter, measure the voltage at the Battery and record. Does the DRB show "ignition voltage" within 1 volt of the Battery volts? Yes → Go To 208 No → Repair the Fused Ignition Switch Output Circuit for high resistance. Perform ABS Verification Test VER-1A.	All
208	Engine Running. Raise RPM's above 1800. Using a Voltmeter, measure the Battery voltage. Is the voltage below 13.0 volts? Yes → Refer to appropriate service instructions for charging system testing and repair. Perform ABS Verification Test VER-1A. No → Test Complete.	All

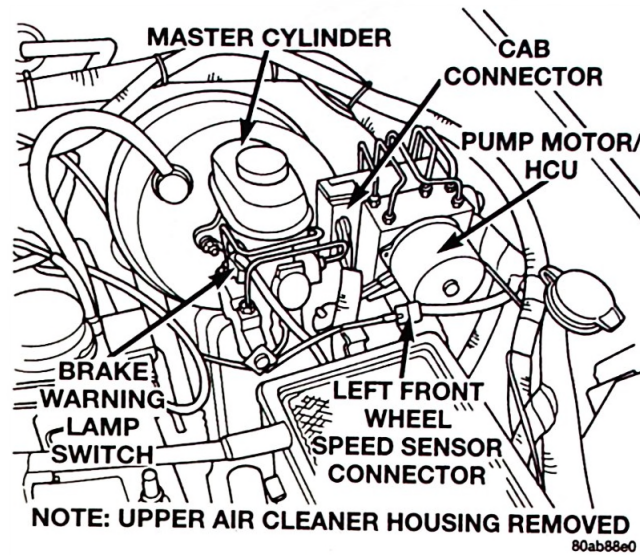
VERIFICATION TESTS

Verification Tests

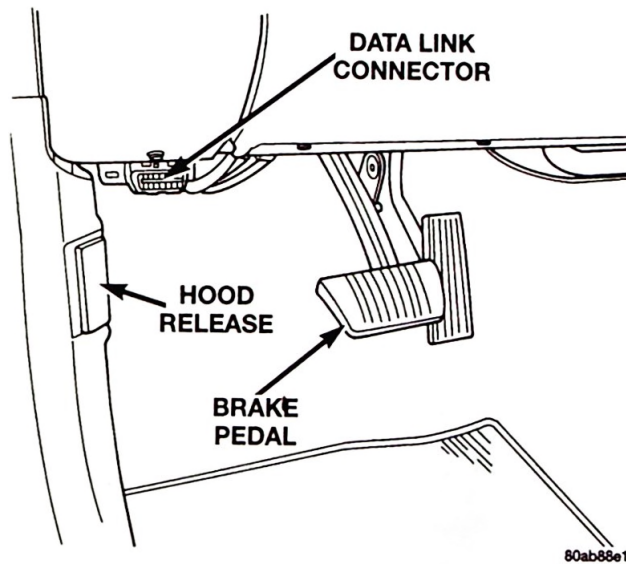
TROUBLE CODES PRESENT	APPLICABILITY
<p>Connect all previously disconnected components and connectors.</p> <p>With the DRB, erase all DTCs.</p> <p>Turn the ignition key on. With the DRB, read trouble codes. If any trouble codes are present, repeat Test 1A.</p> <p>If there are no codes present upon key up, road test the vehicle for at least 5 minutes. Perform several antilock braking stops and traction control starts if equipped.</p> <p>Caution: Ensure braking capability is available before road testing.</p> <p>Note: When the DRB is in ABS diagnostics, the ABS system is disabled.</p> <p>Again, with the DRB, read trouble codes. If any codes are present, repeat Test 1A.</p> <p>If there are no trouble codes present and the customer's complaint can no longer be duplicated, the repair is complete.</p>	All

8.0 COMPONENT LOCATIONS

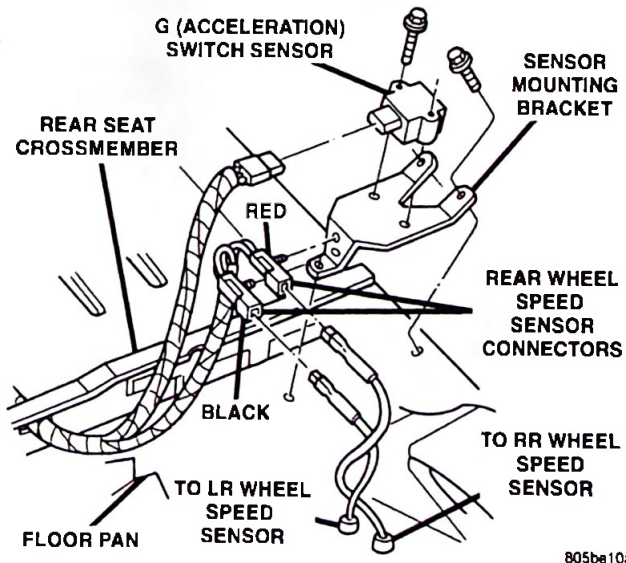
8.1 CONTROLLER ANTILOCK BRAKE



8.2 DATA LINK CONNECTOR

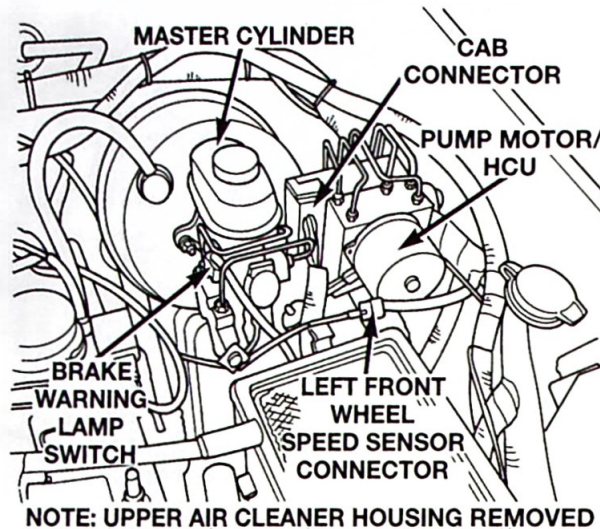


8.3 G-SWITCH



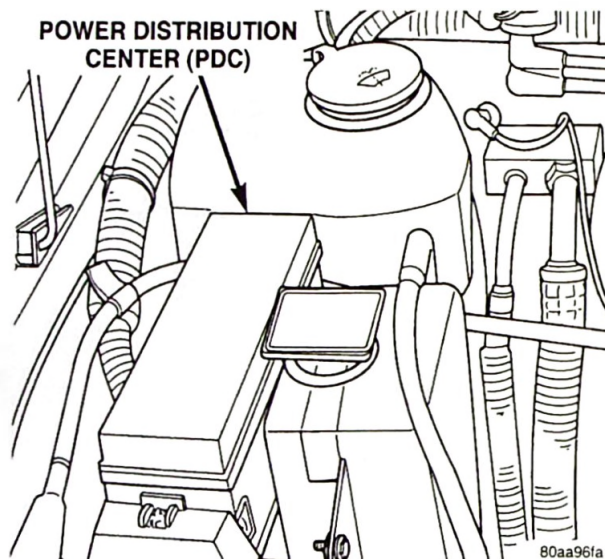
COMPONENT LOCATIONS

8.4 HYDRAULIC CONTROL UNIT



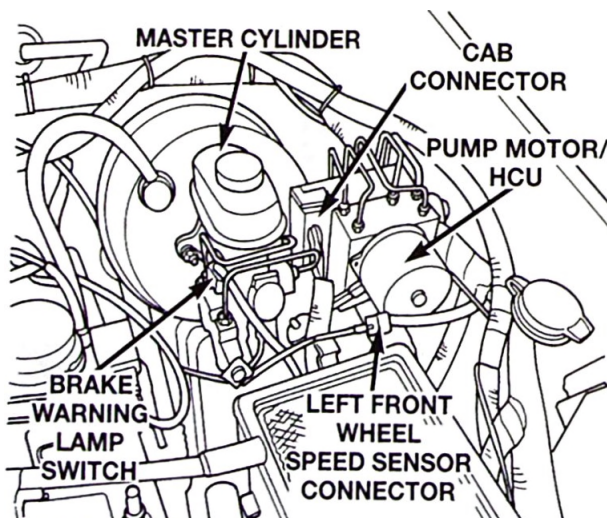
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8.5 FUSES



80aa961a

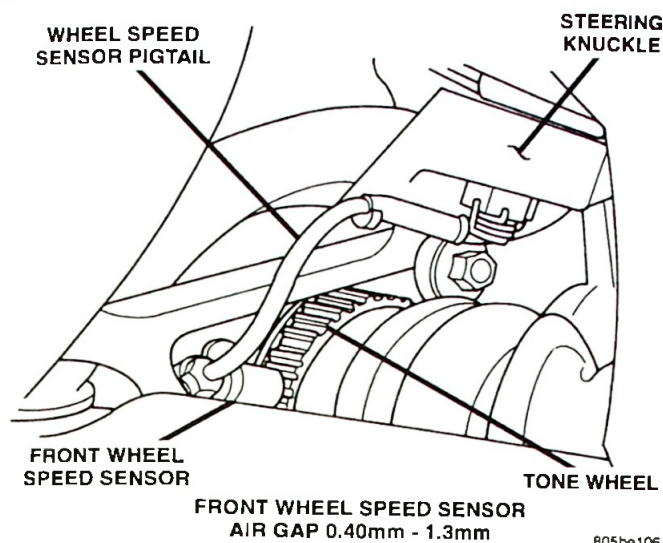
8.6 PUMP MOTOR



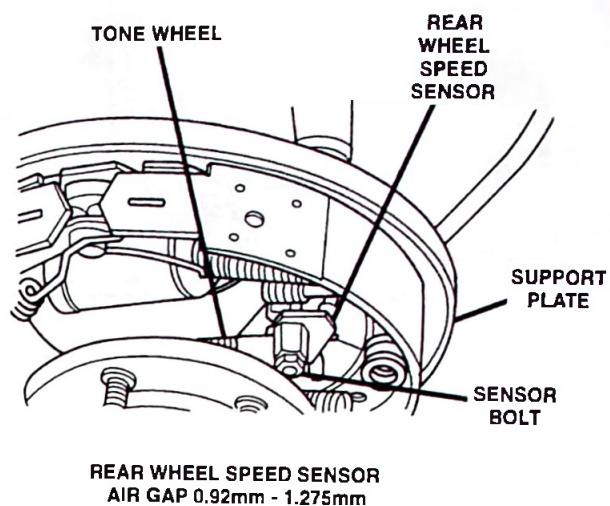
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8.7 WHEEL SPEED SENSORS

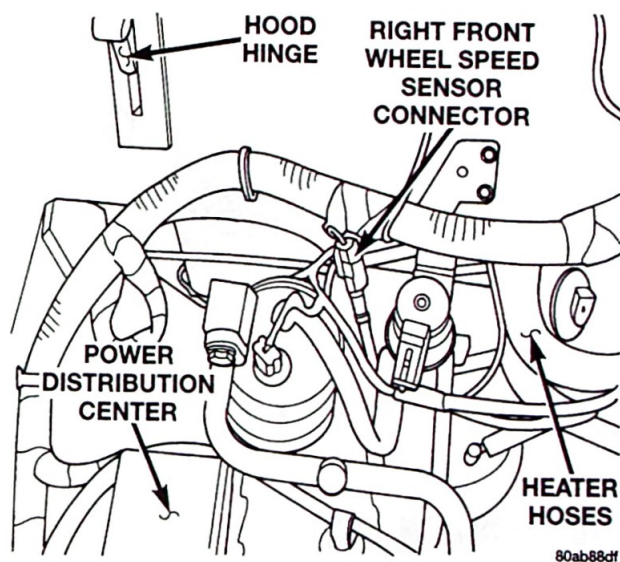
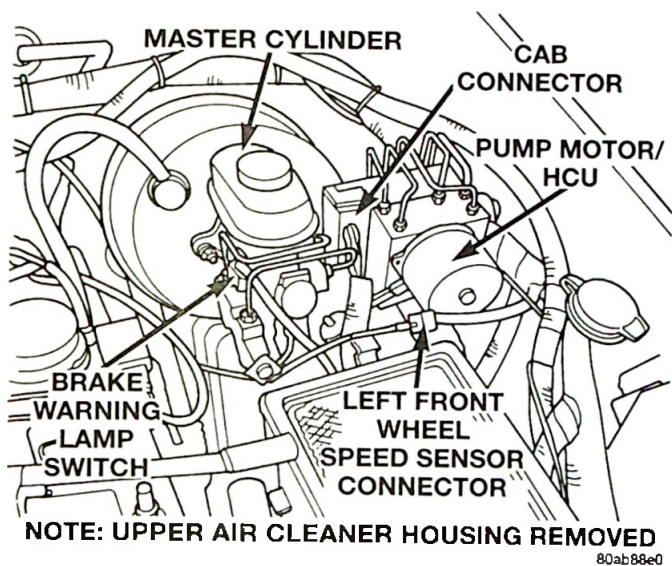
FRONT



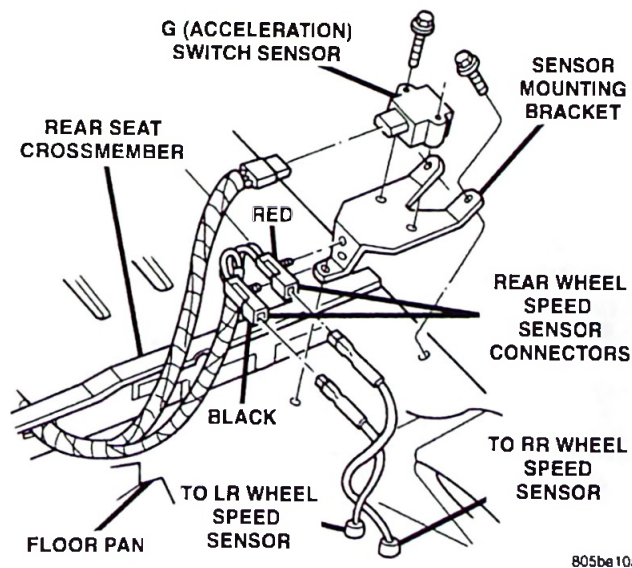
REAR DRUM BRAKES



8.8.1 WHEEL SPEED SENSOR CONNECTORS - FRONT

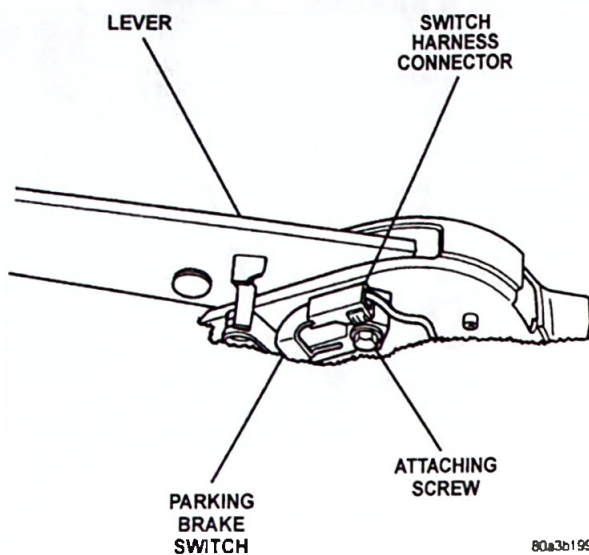


8.8.2 WHEEL SPEED SENSOR CONNECTORS - REAR

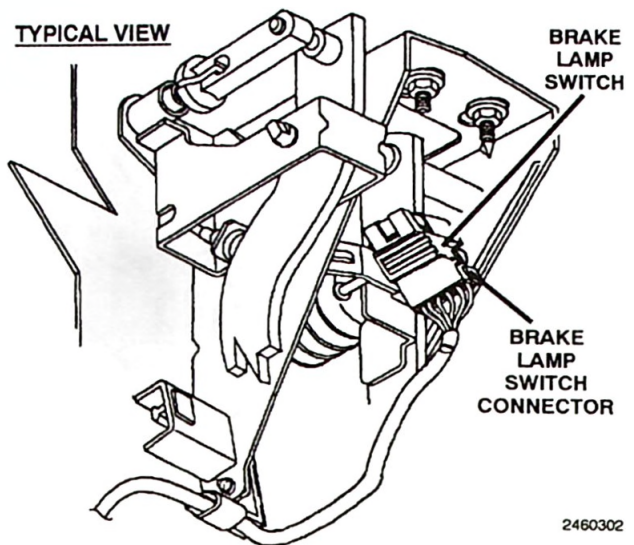


COMPONENT LOCATIONS

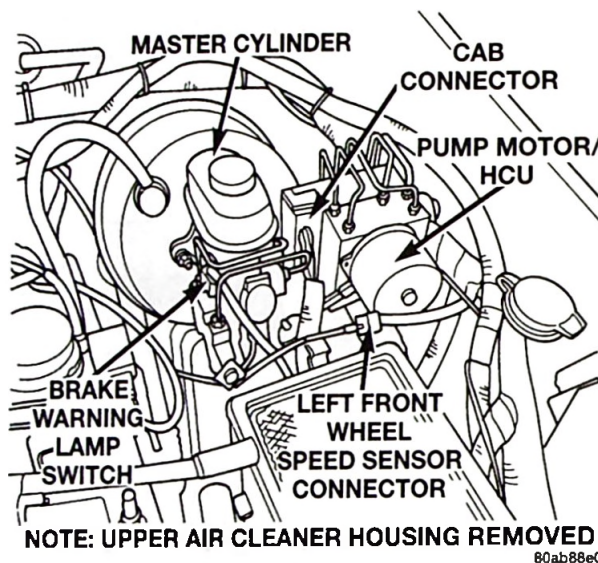
8.9 BRAKE SWITCHES



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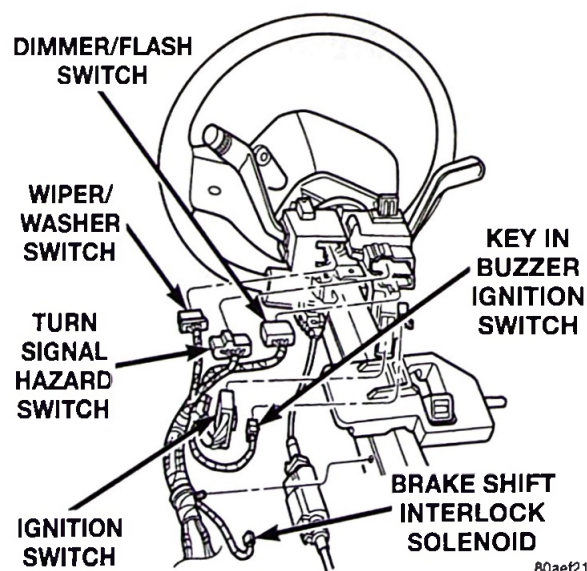
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NOTE: UPPER AIR CLEANER HOUSING REMOVED

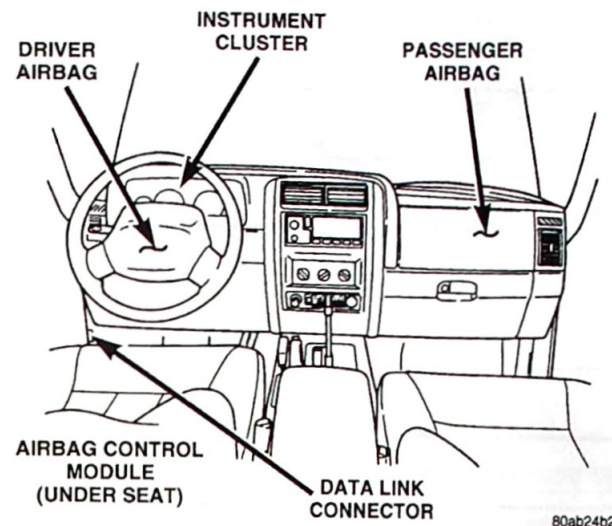
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8.10 IGNITION SWITCH



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8.11 INSTRUMENT CLUSTER

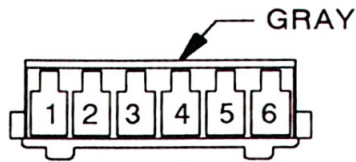


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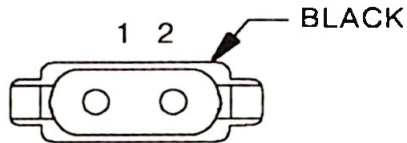
9.0 CONNECTOR PINOUTS



BRAKE LAMP SWITCH

BRAKE LAMP SWITCH - GRAY 6 WAY

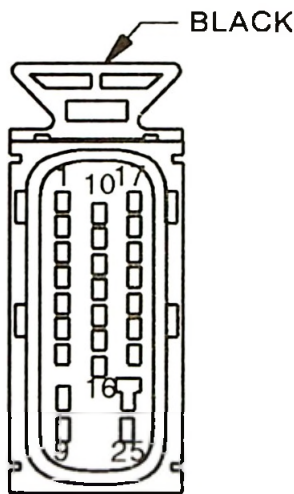
CAV	CIRCUIT	FUNCTION
1	K29 18WT/PK	BRAKE LAMP SWITCH SENSE
2	Z1 18BK	GROUND
3	V32 20YL/RD	SPEED CONTROL ON/OFF SENSE
4	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
5	L50 20WT/TN	BRAKE LAMP SWITCH OUTPUT
6	F32 20PK/DB	FUSED B(+)



BRAKE WARNING PRESSURE SWITCH

BRAKE WARNING PRESSURE SWITCH - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
1	G9 20GY/BK	RED BRAKE WARNING INDICATOR DRIVER
2	G99 20GY/WT	RED BRAKE WARNING INDICATOR DRIVER

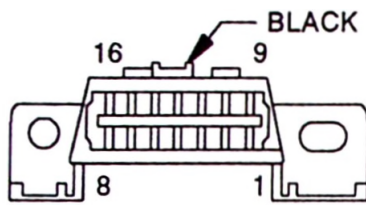


CONTROLLER ANTI-LOCK BRAKE

CONTROLLER ANTI-LOCK BRAKE - BLACK 25 WAY

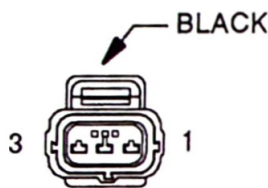
CAV	CIRCUIT	FUNCTION
1	B1 18YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	B3 18LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
3	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)
4	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)
5	-	-
6	B41 18YL/VT	G SWITCH NO. 1 SENSE
7	B42 18TN/WT	G SWITCH NO. 2 SENSE
8	Z1 12BK	GROUND
9	A20 12RD/DB	FUSED B(+)
10	B4 18LG	LEFT REAR WHEEL SPEED SENSOR (+)
11	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
12	L50 18WT/TN	BRAKE LAMP SWITCH OUTPUT
13	B43 18PK/OR	G SWITCH TEST SIGNAL
14	-	-
15	-	-
16	G83 18GY/BK	ABS RELAY CONTROL
17	B2 18YL	RIGHT REAR WHEEL SPEED SENSOR (+)
18	B6 18WT/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
19	-	-
20	D21 18PK	SCI TRANSMIT
21	-	-
22	-	-
23	F15 18DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN)
24	Z1 12BK	GROUND
25	A10 12RD/DG	FUSED B(+)

CONNECTOR PINOUTS



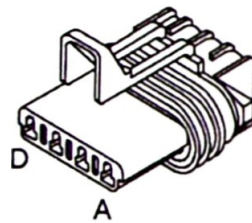
DATA LINK
CONNECTOR

DATA LINK CONNECTOR - BLACK 16 WAY		
CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	D1 18VT/BR	CCD BUS (+)
4	Z1 18BK	GROUND
5	Z12 18BK/TN	GROUND
6	D20 20LG/BK	SCI RECEIVE
7	D21 20PK	SCI TRANSMIT
8	-	-
9	-	-
10	-	-
11	D2 18WT/BK	CCD BUS (-)
12	-	-
13	-	-
14	-	-
15	-	-
16	F34 18TN/BK	FUSED B(+)



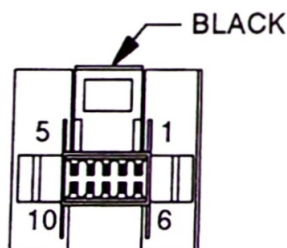
G SWITCH

G SWITCH - BLACK 3 WAY		
CAV	CIRCUIT	FUNCTION
1	B42 20TN/WT	G SWITCH NO. 2 SENSE
2	B41 20YL/VT	G SWITCH NO. 1 SENSE
3	B43 20PK/OR	G SWITCH TEST SIGNAL



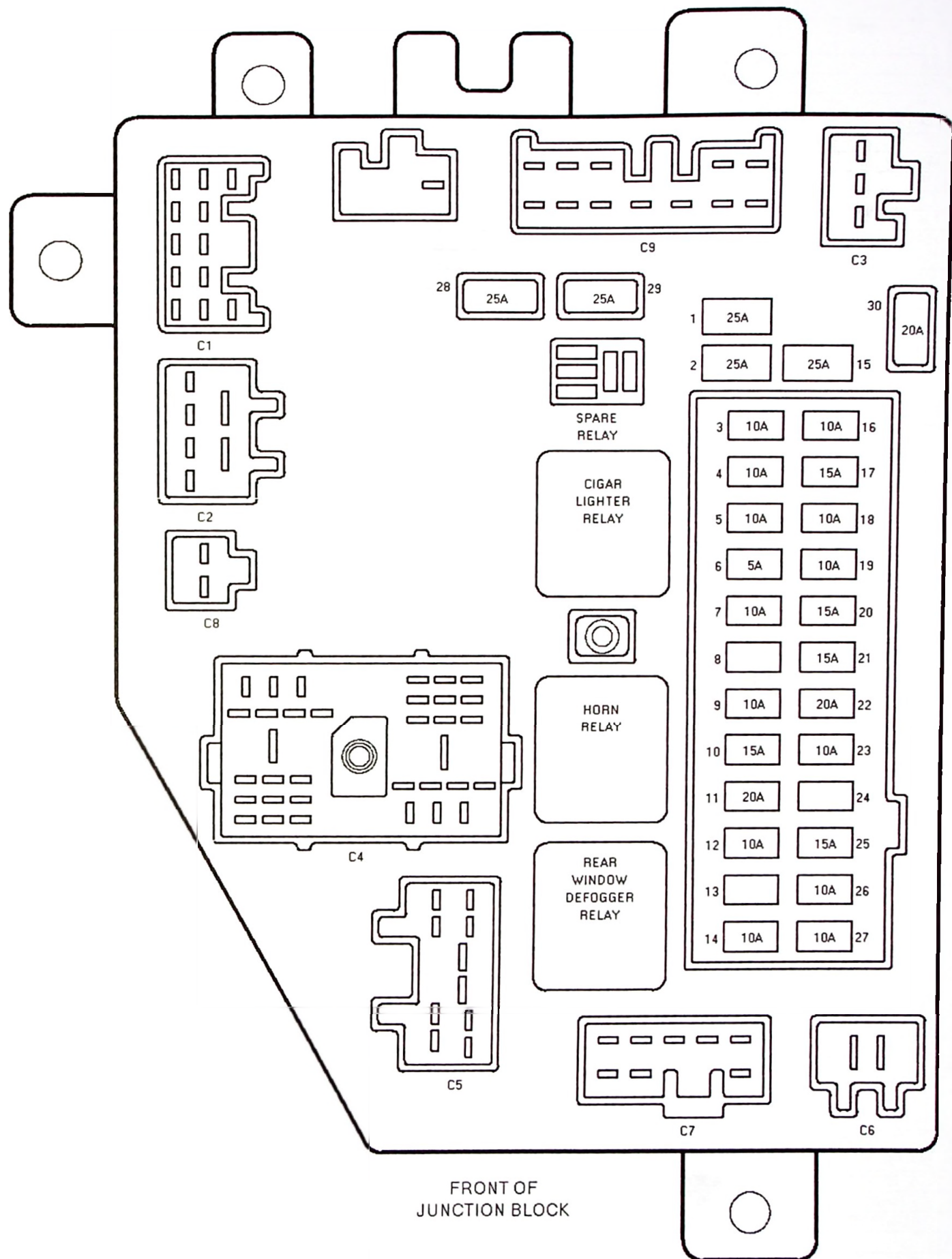
HYDRAULIC
CONTROL UNIT
(HCU) CONNECTOR

HYDRAULIC CONTROL UNIT (HCU) CONNECTOR - 4 WAY		
CAV	CIRCUIT	FUNCTION
A	GR	REAR ISOLATION VALVE CONTROL
B	WT	REAR DUMP VALVE CONTROL
C	LB	REAR VALVE RESET SWITCH SENSE
D	BK	GROUND



INSTRUMENT
CLUSTER - C2

INSTRUMENT CLUSTER C2 - BLACK 10 WAY		
CAV	CIRCUIT	FUNCTION
1	D2 20WT/BK	CCD BUS (-)
2	D1 20VT/BR	CCD BUS (+)
3	C81 20LB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
4	C80 20DB/WT	REAR WINDOW DEFOGGER SWITCH SENSE
5	G107 20BK/RD	4WD SWITCH SENSE
6	L60 20TN	RIGHT TURN SIGNAL
7	G106 20BK/WT	PART TIME 4WD INDICATOR LAMP
8	G26 20LB	DOOR LOCK INHIBIT SENSE
9	Z2 18BK/LG	GROUND
10	G10 20LG/RD	SEAT BELT SWITCH SENSE



CONNECTOR PINOUTS

CONNECTOR PINOUTS

FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	25A	F38 16RD/LB	A7 10RD/BK
2	25A	INTERNAL	A7 10RD/BK
3	10A	L33 20RD	L3 16RD/OR
4	10A	L43 20VT	L4 16VT/WT
5	10A	L44 20VT/RD	L4 16VT/WT
6	5A	E2 200R	E1 20TN
7	10A	INTERNAL	L7 18BK/YL
8	-	-	A21 12DB
9	10A	F87 20WT/BK	A21 12DB
10	15A	F20 18WT	A21 12DB
11	20A	F12 18DB/WT	A21 12DB
12	10A	INTERNAL	A22 12BK/OR
12	10A	L5 20BK	A22 12BK/OR
13	-	-	A4 12BK/PK
14	10A	INTERNAL	INTERNAL
15	25A	F35 16RD	A7 10RD/BK
16	10A	L34 20RD/OR	L3 16RD/OR
17	15A	X12 16RD/WT	A31 12BK/WT
18	10A	F83 18YL/DG	A31 12BK/WT
19	10A	F45 20YL/RD	A41 14YL
20	15A	A6 20RD/OR	A7 10RD/BK
21	15A	INTERNAL	A7 10RD/BK
22	20A	V23 18BR/PK	A22 12BK/OR
23	10A	INTERNAL	L7 18BK/YL
24	-	-	A22 12BK/OR
25	15A	F15 20DB/WT	A22 12BK/OR
26	10A	F14 18LG/YL	A22 12BK/OR
27	10A	F23 18DB/YL	A21 12DB

CIGAR LIGHTER RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	Z1 14BK	GROUND
86	A31 12BK/WT	FUSED IGNITION SWITCH OUTPUT (RUN-ACC)
87	F30 16RD	CIGAR LIGHTER RELAY OUTPUT
87A	-	-

CIRCUIT BREAKERS

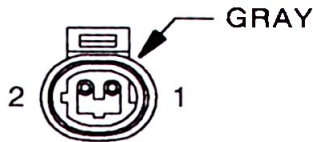
CB NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
28	25A	INTERNAL	A31 12BK/WT
29	25A	F37 15RD/LB	A7 10RD/BK
30	20A	V6 16DB	A31 12BK/WT

HORN RELAY

CAV	CIRCUIT	FUNCTION
30	INTERNAL	FUSED B(+)
85	X3 20BK/RD	HORN RELAY CONTROL
86	A7 10RD/BK	FUSED B(+)
87	X2 20DG/RD	HORN RELAY OUTPUT
87A	-	-

REAR WINDOW DEFOGGER RELAY

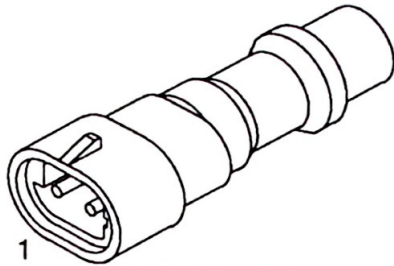
CAV	CIRCUIT	FUNCTION
30	A4 12BK/PK	FUSED B(+)
85	C81 20LB/WT	REAR WINDOW DEFOGGER RELAY CONTROL
86	INTERNAL	FUSED IGNITION SWITCH OUTPUT (RUN)
87	C15 12BK/WT	REAR WINDOW DEFOGGER RELAY OUTPUT
87A	-	-



LEFT FRONT
WHEEL SPEED
SENSOR

LEFT FRONT WHEEL SPEED SENSOR - GRAY 2 WAY

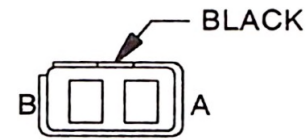
CAV	CIRCUIT	FUNCTION
1	B8 18RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
2	B9 18RD	LEFT FRONT WHEEL SPEED SENSOR (+)



LEFT FRONT
WHEEL SPEED
SENSOR
CONNECTOR
(SENSOR SIDE)

LEFT FRONT WHEEL SPEED SENSOR (SENSOR SIDE)

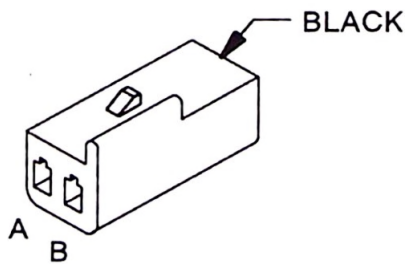
CAV	CIRCUIT	FUNCTION
1	RD/DB	LEFT FRONT WHEEL SPEED SENSOR (-)
2	RD	LEFT FRONT WHEEL SPEED SENSOR (+)



LEFT REAR
WHEEL SPEED
SENSOR

LEFT REAR WHEEL SPEED SENSOR - BLACK 2 WAY

CAV	CIRCUIT	FUNCTION
A	B3 20LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
B	B4 20LG	LEFT REAR WHEEL SPEED SENSOR (+)

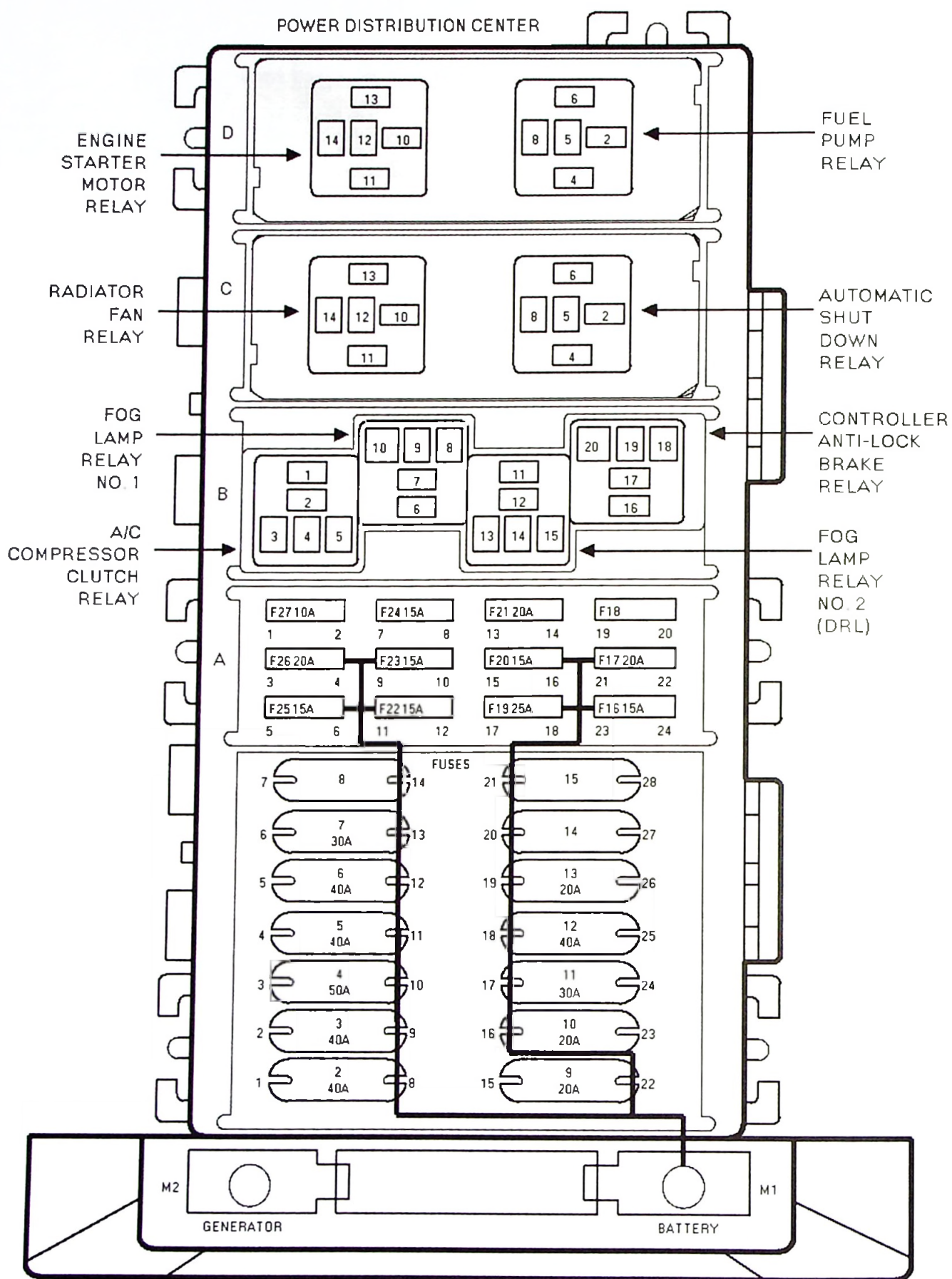


LEFT REAR
WHEEL SPEED
SENSOR
CONNECTOR
(SENSOR SIDE)

LEFT REAR WHEEL SPEED SENSOR (SENSOR SIDE)

CAV	CIRCUIT	FUNCTION
1	LG/DB	LEFT REAR WHEEL SPEED SENSOR (-)
2	LG	LEFT REAR WHEEL SPEED SENSOR (+)

CONNECTOR PINOUTS



FUSES

FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	40A	-	-
2	40A	A1 12RD	A0 6RD
3	40A	A2 12PK/BK	A0 6RD
4	50A	A7 10RD/BK	A0 6RD
5	40A	F141 12LG/RD	A0 6RD
6	40A	A111 12RD/LG	A0 6RD
7	30A	A3 14RD/WT	A0 6RD
7	30A	A3 14RD/WT (DRL)	A0 6RD
8	-	-	-
9	20A	A17 16RD/BK	A0 6RD
9	20A	A17 16RD/BK	A0 6RD
10	20A	A41 16YL	A0 6RD
11	30A	A4 12BKPK	A0 6RD
12 (ABS)	40A	A10 12RD/DG	A0 6RD
13 (ABS)	20A	A20 12RD/DB	A0 6RD
14	-	-	-
15	-	-	-
16	15A	M1 20PK	A0 6RD
17	20A	F34 18TN/BK	A0 6RD
18	-	-	-
19	25A	A16 16RD/LG	A0 6RD
20	15A	L9 20BK/PK	A0 6RD
21	20A	A142 18DG/OR	A999 16RD
22	15A	A61 14DG/BK	A0 6RD
23	15A	F32 20PK/DB	A0 6RD
24	15A	F142 20DG/WT	A999 16RD
25	15A	F51 20WT/OR	A0 6RD
26	20A	F75 16VT	A0 6RD
27	10A	F1 20DB/GY	A17 16RD/BK

A/C COMPRESSOR CLUTCH RELAY

CAV	CIRCUIT	FUNCTION
B1	A17 16RD/BK	FUSED B(+)
B2	C3 16DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
B3	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
B4	-	-
B5	F20 18WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)

AUTOMATIC SHUT DOWN RELAY

CAV	CIRCUIT	FUNCTION
C2	A16 16RD/LG	FUSED B(+)
C4	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
C5	-	-
C6	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
C8	A999 16RD	AUTOMATIC SHUT DOWN RELAY OUTPUT
C8	A999 16RD	AUTOMATIC SHUT DOWN RELAY OUTPUT

CONTROLLER ANTI-LOCK BRAKE RELAY

CAV	CIRCUIT	FUNCTION
B16	G19 20LG/OR	ABS WARNING INDICATOR DRIVER
B17	-	-
B18	G83 18GY/BK	ABS RELAY CONTROL
B19	Z1 20BK	GROUND
B20	F15 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN)

CONNECTOR PINOUTS

ENGINE STARTER MOTOR RELAY

CAV	CIRCUIT	FUNCTION
D10	A41 16YL	FUSED B(+)
D11	T41 20BK/WT	PARK/NEUTRAL POSITION SWITCH SENSE
D11	T41 20BK/WT	PARK/NEUTRAL POSITION SWITCH SENSE
D11	Z1 20BK (4.0L M/T)	GROUND
D12	-	-
D13	F45 20YL/RD (LHD 4.0L A/T)	FUSED B(+) ENGINE STARTER MOTOR RELAY
D13	T141 20YL (2.5L, 4.0L M/T, RHD 4.0L A/T)	IGNITION SWITCH OUTPUT (START)
D14	T40 16BR	STARTER RELAY OUTPUT

FOG LAMP RELAY NO. 1

CAV	CIRCUIT	FUNCTION
B6	F61 20WT/OR	FUSED B(+)
B7	L139 20VT	FOG LAMP RELAY OUTPUT
B7	L92 20PK (DRL)	FOG LAMP RELAY OUTPUT
B8	L35 20BR/WT	FOG LAMP RELAY CONTROL
B8	Z1 20BK (DRL)	GROUND
B8	Z1 20BK (DRL)	GROUND
B9	-	-
B10	L77 20BR/YL	FUSED LEFT INBOARD TAIL LAMP
B10	L77 20BR/YL	FUSED LEFT INBOARD TAIL LAMP

FOG LAMP RELAY NO. 2 (DRL)

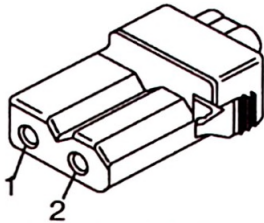
CAV	CIRCUIT	FUNCTION
B11	L92 20PK	FOG LAMP RELAY OUTPUT
B12	-	-
B13	Z1 20BK	GROUND
B14	L139 20VT	FOG LAMP RELAY OUTPUT
B15	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER
B15	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER

FUEL PUMP RELAY

CAV	CIRCUIT	FUNCTION
D2	A61 14DG/BK	FUSED B(+)
D2	A61 16DG/BK	FUSED B(+)
D4	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
D6	K31 18BR	FUEL PUMP RELAY CONTROL
D8	A141 14DG/WT	FUEL PUMP RELAY OUTPUT

RADIATOR FAN RELAY

CAV	CIRCUIT	FUNCTION
C10	F141 12LG/RD	FUSED B(+)
C11	F20 18WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
C12	-	-
C13	Q27 18DB/PK	RADIATOR FAN RELAY CONTROL
C14	Q25 12LB	RADIATOR FAN RELAY OUTPUT



PUMP MOTOR
CONNECTOR

PUMP MOTOR CONNECTOR - 2 WAY

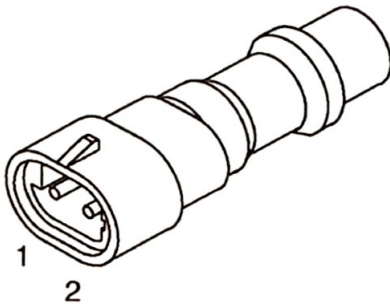
CAV	CIRCUIT	FUNCTION
1	TN	GROUND
2	RD	PUMP/MOTOR RELAY OUTPUT



RIGHT FRONT
WHEEL SPEED
SENSOR

RIGHT FRONT WHEEL SPEED SENSOR - 2 WAY

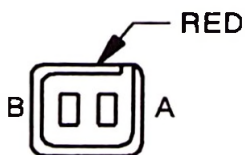
CAV	CIRCUIT	FUNCTION
1	B6 18WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
2	B7 18WT	RIGHT FRONT WHEEL SPEED SENSOR (+)



RIGHT FRONT
WHEEL SPEED
SENSOR
CONNECTOR
(SENSOR SIDE)

RIGHT FRONT WHEEL SPEED SENSOR (SENSOR SIDE)

CAV	CIRCUIT	FUNCTION
1	WT/DB	RIGHT FRONT WHEEL SPEED SENSOR (-)
2	WT	RIGHT FRONT WHEEL SPEED SENSOR (+)

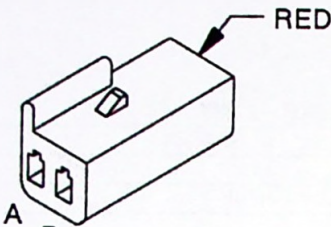


RIGHT REAR
WHEEL SPEED
SENSOR

RIGHT REAR WHEEL SPEED SENSOR - RED 2 WAY

CAV	CIRCUIT	FUNCTION
A	B1 20YL/DB	REAR WHEEL SENSOR (-)
B	B2 20YL	REAR WHEEL SENSOR (+)

CONNECTOR PINOUTS

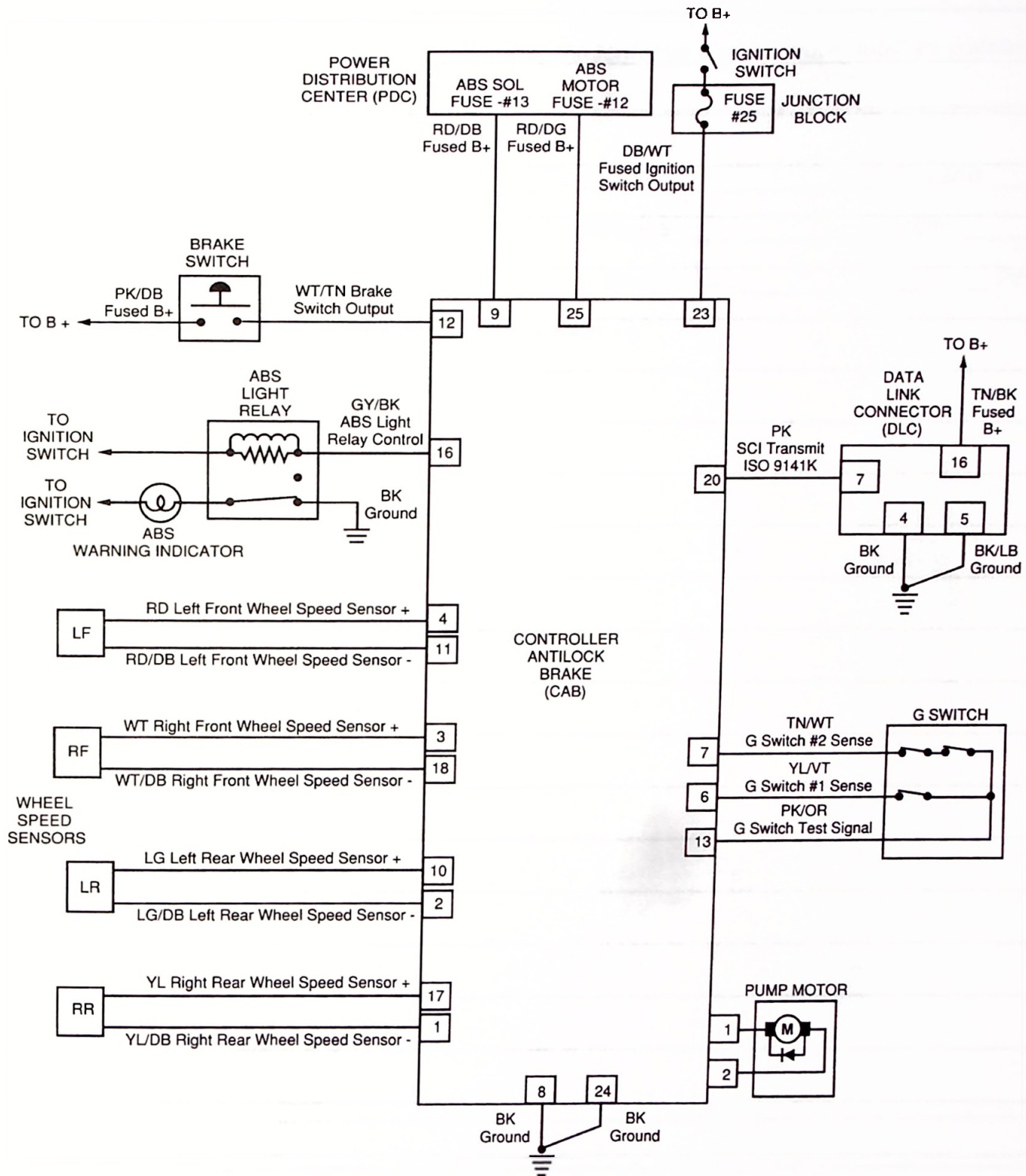


RIGHT REAR
WHEEL SPEED
SENSOR
CONNECTOR
(SENSOR SIDE)

RIGHT REAR WHEEL SPEED SENSOR (SENSOR SIDE)		
CAV	CIRCUIT	FUNCTION
1	YL/DB	RIGHT REAR WHEEL SPEED SENSOR (-)
2	18YL	RIGHT REAR WHEEL SPEED SENSOR (+)

CONNECTOR PINOUTS

10.0 SCHEMATICS



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NOTES

DIAGNOSTIC TEST PROCEDURES — TELL US!

Chrysler is constantly working to provide the technician the best diagnostic manuals possible. Your comments and recommendations regarding the Chrysler diagnostic manuals and procedures are appreciated.

To best understand your suggestion, please complete the form giving us as much detail as possible.

Model _____ Year _____ Body Type _____ Engine _____

Transmission _____ Vehicle Mileage _____ MDH _____

Diagnostic Procedure _____ Book No. _____ Page _____

Comments/recommendations (if necessary, draw sketch)

Name _____

Submitted by: _____

Address _____

City/State/Zip _____

Business Phone # _____

All comments become property of Chrysler Corporation and may be used without compensation.

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To best understand your suggestion, please complete the form giving us as much detail as possible.

Model _____ Year _____ Body Type _____ Engine _____
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Diagnostic Procedure _____ Book No. _____ Page _____
Comments/recommendations (if necessary, draw sketch)

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All comments become property of Chrysler Corporation and may be used without compensation.

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